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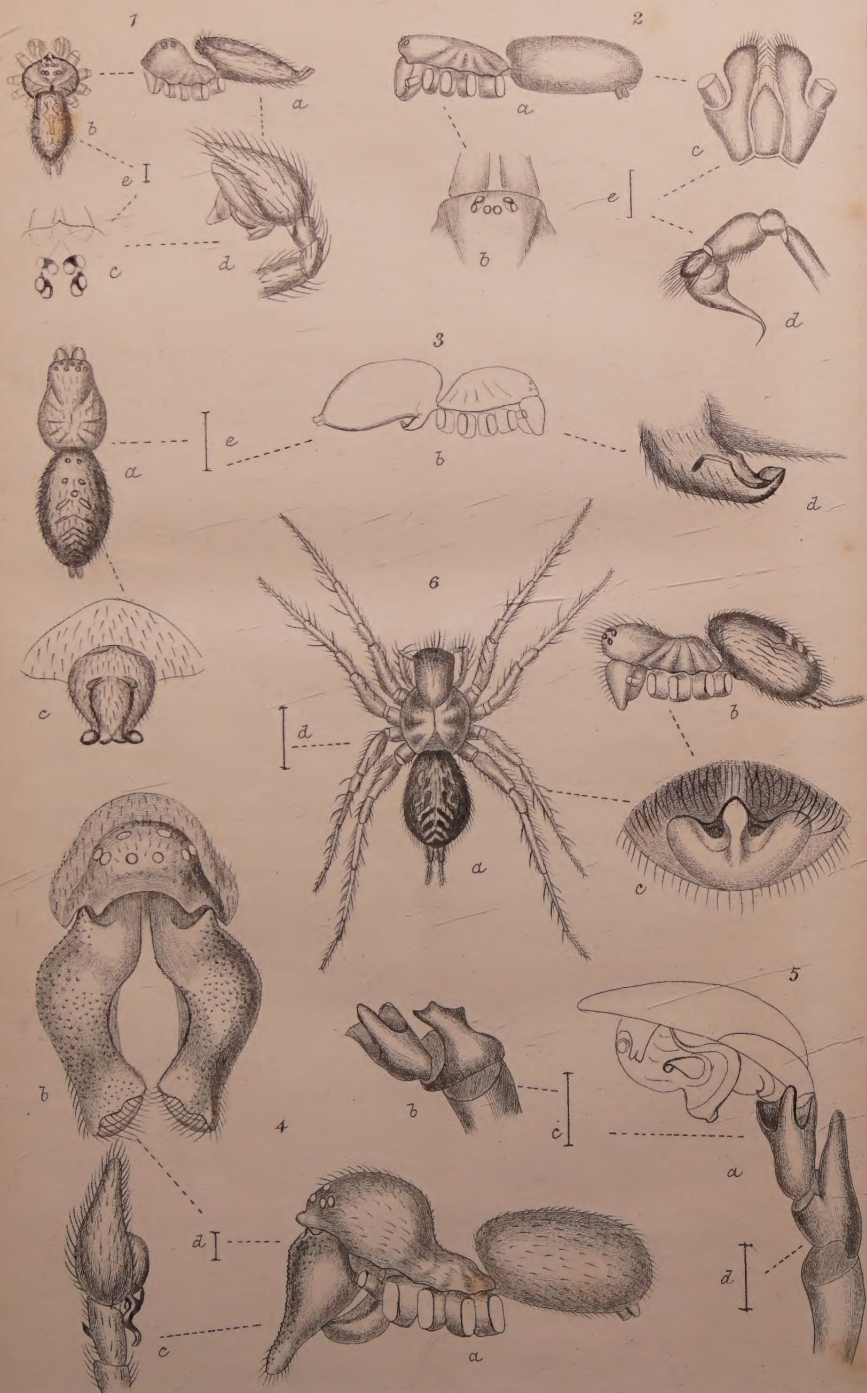
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On the Geographical Relations of the Chief Coleopterous Faunæ.

By ANDREW MURRAY.

[Read December 17, 1868.]\*

JUDGING simply from their structure, habits, and economy, there are reasons why Beetles ought to excel every other class of organized beings as exponents of the past geography of the globe. I say so after having turned over in my mind and contrasted every class of animals and plants with each other with the view of determining for myself which would be most likely, through the study of its geographical distribution, to throw light upon the past history of the earth. I can think of none so likely to do so as insects, and of insects as Beetles.

Over all marine animals they have the insuperable advantage of inhabiting the enclosed instead of the enclosing spaces, of living on dry land and not being able to go beyond it. Over plants, with which their distribution in many respects accords, they have the advantage of being more difficult of dissemination, for neither their eggs nor themselves are endowed with the dormant vitality of seeds, nor with that endurance of exposure to different condi-

\* This paper was read on December 17, 1868, but by permission of the Council I have brought it down to the state of our knowledge at the date of publication.  
—A. M.



tions which may, and occasionally does, enable seeds to be carried in the stomachs of birds or floated across wide oceans to distant lands \*. They have also the advantage over the larger and more highly organized animals in that they can survive and find food where the latter could not. Their food is so various that nothing but a total extinction of all other life could wipe them off from the face of a country—a partial submergence of land for even a short period might destroy every mammal upon it, but so long as a tree-top is above the flood or an uncovered rock remains on which they can take refuge, the life of the Beetle class is safe when the waters abate. A succession of cold seasons in which no plant can bloom might destroy those kinds of animals for which, like the bee, flowers and honey are necessities of life, some beetles might indeed then go ; but there are plenty that feed on leaves or stems to preserve the Beetle type in the frozen land. Their numbers, too, multiply the chances of escape in the case of disaster, and their powers of flight enable them to take advantage of such as occur. Further, the powers of flight, although sufficient for a moderate distance, are not like those of birds, so great as to carry them to new lands at great distances and so to risk the disturbance of faunas which such powers, if possessed by such multitudes, might possibly produce. In many respects, too, they are as much *adstricti glebæ* as plants themselves, for a vast host are limited each to one particular plant for food. As in plants, indeed, there are some kinds of Beetles more open than others to the suspicion of having been introduced from one isolated land to another, as, for example, the timber-borers or Longicorns. But there are others, as the hunting or carnivorous species, the apterous species, the blind insects, and others of less specialized structure, whose presence in discontinuous countries seems to bid defiance to any explanation other than that of former continuity of soil. In Madeira, for instance, where the number of admittedly introduced species is very great, there is not one introduction belonging to the hunting families ; and if this is the case there, not-

\* It is a digression, but it is worth making one, to point out that if plants *can* be disseminated in the way supposed, and Beetles, or certain families of Beetles, *can not*, the attempt to explain the distribution of the former as due either solely or mainly to these means must be abandoned in every case where their distribution corresponds with that of the latter. The common effect must have been produced by a common cause. And it so happens that this correspondence exists in all the more important and puzzling facts of distribution.



withstanding the accessibility of Madeira to the introducing agencies of man (to which most of the other introductions are referable), it becomes still more difficult to conceive of the dissemination of that kind of beetles by agencies independent of man.

But besides the advantages which the structure, habits, and economy of beetles give for the interpretation of their geographical distribution, there is another important speciality inherent in them which I shall amply illustrate in the course of this paper, and which renders them peculiarly available for the study of its problems, viz. a long-enduring persistency of form by which the same type has been preserved through diverse modifications during many geological epochs. This peculiarity is shared by all other insects, as well as in different degrees by all beings of inferior organization; and the consequence is that in trying to make out the past history of a country through its fauna and flora, we must take each class of beings by itself and study its relations separately, or we shall run the risk of confounding events belonging to different dates. To do otherwise would be like attempting to compile a history of England by combining the political history of one age with the ecclesiastical of another and the scientific of a third. The mammalian fauna took its present form long after the insects had received theirs, and these earlier-dated forms should therefore be able to tell of events long antecedent to what the mammals could speak of. The relations of each must therefore be studied independently, and it is only after all shall have been separately deciphered that the conclusions respectively drawn from each can be brought together and some common general result arrived at. In the mean time, by endeavouring to ascertain the relative date of appearance of insects of various types in different countries, we may be able to assign the order of precedence of a succession of events whose occurrence we can scarcely doubt, but whose order of date we could not otherwise guess at.

My purpose in the present paper is to submit some inferences of this nature from a general view of the geographical distribution of the Coleoptera, indicating a somewhat different arrangement of land and water in ancient times from that which is usually supposed, and to strengthen these inferences by references to what seem to me corresponding facts in other branches of natural history.

The first point to which I shall direct attention is the very in-

interesting problem of the occurrence of similar forms in the temperate and cold regions of both hemispheres. Hitherto the hypotheses by which this has been attempted to be explained have, I believe, either been: 1st, by accidental introduction; 2nd, by the supposition that the glacial epoch had so modified the climate of the globe as to allow an extension or interchange of faunas lying on different sides of the equator; 3rd, by the supposition that one general fauna had formerly extended over the whole world, and that the similarities which we find in antipodal countries are relics of this general fauna; and 4th, that a former geographical connexion with identity of fauna and flora must have subsisted between the two regions. There is another hypothesis to the effect that the similar species are *representative* species, meaning by representative something different from derivative and independent of affinity. This latter proposition, I frankly confess, is beyond my conception. I cannot conceive of any other kind of representation in species than that arising from derivation. The other hypotheses are entitled to more consideration, and I shall briefly state my opinion upon each.

As to similarity being due to the introduction of species by accidental dispersal, it is to be noted that this cause must always be in its very nature exceptional and isolated, and cannot be expected to make its impress on a whole fauna.

The Atlantic islands, for example, which were, and perhaps still are, very generally cited as an instance of colonization by accidental introduction, have been shown by Mr. Wollaston to have all one coleopterous subfauna, and that one peculiar to themselves. The general basis is European, but overlying that is something else, a number of species of special type found in all and found nowhere else. Now if these islands, as is maintained by some, have been peopled by chance visitors from Europe, how have they all got in addition this special type? and why should there be, as in Trophonius Cave, "*vestigia nulla retrorsum*"? Why have none of these special forms ever wandered to Europe? Why should things only come from Europe and nothing ever go back in return? There is no law against reciprocity here, and yet it is rigorously excluded. Moreover the explanation, if true, should apply to every part of the globe, and illustrations of its existence should be in greatest force in the lands which are nearest to each other and which have most intercourse with each other. And this is notoriously not the case. Australia, although so much



nearer India than Chili, has more affinity with the latter than the former. The Cape-Verde Islands, although so near Cape Verde, have their affinity not with Africa, but with Europe and the other Atlantic Islands. Even in the introductions by man it does not apply. Hear what DeCandolle says of plants. "I am surprised that the commerce of the United States, with Brazil, Chili, New Zealand, the Sandwich Islands, and China, a commerce which has been carried on with great activity for upwards of thirty years, has not yet brought about the naturalization of species from these regions. Up to the present time there is no appearance of it. The *Rubieva multifida*, which has begun to appear at New York, and of which the naturalization is not yet consolidated by the proof of time, is the only plant perhaps which has come in this manner. In future some will arrive, without doubt." [Why so? Surely not from what has happened in the past?] "They may compensate to some extent perhaps the probable diminution of those which will come from Europe"\*.

Facts are accumulating upon us to show that diffusion of plants and animals by accidental circumstances beyond physical barriers, such as seas or impassable mountains or deserts, bears no important part in the establishment of any definite fauna or flora. They bear a part, although a small one, in the introduction of occasional new elements into a fauna or flora; but these remain like lumps of stone lying on a soil with which they can neither become incorporated nor harmonize, usually readily distinguishable and referable to the mountains or strata more or less distant from which they have come. Actual continuity of soil and non-interruption by barriers is, I believe, the only cause by which any fauna with a definite character (and no true fauna is without one) has been produced, and subsequent isolation, at least so far as regards physical conditions, that by which it has been preserved. The coral islands of the Pacific are a case in point. They have been supplied both with a fauna and flora entirely from without and by chance dispersal; and they furnish an admirable example of the kind and amount of inhabitants that is to be got by such introductions, even under the most favourable circumstances of tranquil seas, warm climate, and favouring currents; and allowance to such an extent I am always ready to make in examining the elements of any fauna or flora. The details of such a fauna and flora will be given further on when I come to discuss the fauna of

\* DeCandolle, *Géogr. Botanique raisonnée*, p. 755 (1855).

the Pacific islands; in the meantime I may briefly characterize it as meagre to the last degree, most unequal in its proportions, and all traceable to the shores of the nearest lands from which the currents set.

The supposition that the existence of the similarity in question is due to the facilities for migration to or from the northern or southern hemispheres afforded by the low temperature of the glacial epoch is open to various answers. But it is unnecessary to discuss them at all; for I shall presently show that the resemblances to which I have to refer were already in existence before the glacial epoch commenced, consequently could not have been caused by it.

The hypothesis that similar forms occurring at distant places are the remains of a general fauna (or, at least, of a *more* general fauna than now exists), which had in former times extended over the whole or the greater part of the world, is more attractive or more formidable.

I used to think that in that hypothesis I had a satisfactory explanation of all such anomalies as I speak of. Like Shakespeare's barber's chair, it fitted all comers. If the similarity was widely spread, it was due to universal prevalence in former times. If found only in one or two isolated spots, then there were solitary relics of a once universally distributed type! But I confess that my faith in my specific has latterly been a good deal shaken. It costs me nothing to say so, for consistency is a vice to which I have never been addicted. I believe it still to be probably the true explanation of those cases (as in Ferns, for example) where the same type is very widely and generally distributed; but I have abandoned it for most isolated instances, and for all specially localized faunas. In the first place, although I do not dispute that in the earlier stages of the history of our planet there was a greater homogeneity of type than there is at present, it seems pretty well established now, that there have been geographical regions with faunas and floras differing from each other, not indeed to the same degree as now, but to some extent, from the very earliest times of which we have any fossil record; and in the next place, although it is not impossible that a universally distributed form may have died out everywhere but in one or more specified spot or spots, the doctrine of chances prevents us accepting the hypothesis whenever such relics cease to be solitary. Species No. 1 may be a relic left at



spots A and B, and nowhere else; but the moment we find another supposed relic, species No. 2, also left in A and B, and nowhere else, doubt assails us, and increases in an inverse ratio with the occurrence of every additional relic.

The fourth supposition is, I think, the true one, namely, continuity of soil at some former period; and upon that as a basis I rest the propositions I am about to submit. Upon it, I think, I can explain satisfactorily many of the remarkable instances of peculiar geographical distribution which have hitherto defied the ingenuity of naturalists to solve, and notably that which I have first set before me, viz. the resemblance which species from the temperate regions of the northern hemisphere bear to those from similar latitudes in the southern hemisphere. With the help of the above postulate I can trace the links all the way from the one to the other plainly in insects, plants, and land-shells, and more imperfectly in the higher animals; but also in them, if allowance be made for the greater variability in form in the higher animals under change of condition of life, and their distribution be examined in relation to the geographical epochs in which the different forms respectively came into being and most prevailed. The absence of particular mammals in a particular land cannot vitiate my theory, if the distribution of animals in it had been completed before the mammals appeared.

For the better understanding of my argument I shall first state the results at which I have arrived.

The position I am about to maintain then is, that, subject to modifications to be afterwards mentioned, all the Coleoptera in the world are referable to one or other of three great stirpes. These three no doubt originally sprung from one stirps, and acquired their distinguishing features by long-continued isolation from each other, combined with changes in their conditions of life. But now we have three, and only three, great strains, sometimes intermingling with each other, sometimes underlying or overlying each other, and sometimes developed into new forms, but always distinguishable and traceable to one or other of the three sources.

These are—1, the Indo-African stirps; 2, the Brazilian stirps; and 3, what, for want of a better name, I shall call the microtypal stirps, in allusion to the general run of the species composing it being of a smaller size, or, more strictly speaking, not containing such large or conspicuous insects as the others. It

is not altogether a satisfactory name, because the stirps does contain some large species, and it is not peculiar to it to abound in small ones. But, taken as a whole, its ingredients are smaller and more modest in appearance than those of the others. The fauna and flora of our own land may be taken as its type and standard.

A like tripartite basis may be traced in every class of beings. It may happen, indeed, that one or other of them, as the Brazilian stirps in mammals (*Edentata* &c., for example), may have almost died out; in others some former stirps, extinct in all the rest, may have survived in some isolated part of the world (as plants in Australia); but, subject to such exceptional modifications, the leading features of my proposition will be found generally applicable to all. It does not come within the scope of my present paper to show more than its application to *Coleoptera*; but I do not mean to deprive myself of the aid to be derived from the occurrence of a similar arrangement in other classes of organized beings, whenever I find that my position needs strengthening. In many points our materials for working out the subject are so meagre that they require every collateral aid, and it is obvious that the more widely I can show the arrangement to apply, the more will my conclusions, as to their occurrence in the *Coleoptera*, be strengthened.

The Indo-African stirps, as its name implies, inhabits Africa south of the Sahara, and India and China south of the Himalayas, also the Malayan district, the Indian archipelago, and the New Guinea group. This range is less modified by the general introduction of foreign elements than that of the next stirps.

The Brazilian stirps inhabits South and Central America east of the Andes, and north of the River Plate, and furnishes, moreover, a large share in the constitution of North America, but has also received in return a very perceptible tinge from the microtypal stirps.

In the microtypal stirps I include the fauna of Europe, Asia north of the Himalayas, Eastern North America, so far as not modified by the Brazilian element; and, what has less of this strain, the whole of North-west America, California, part of the Mexican fauna, Peru, Chili, the Argentine Republic south of Tucuman, Patagonia, Tierra del Fuego, Polynesia, New Zealand, and Australia.

When I first broached this view to one of my friends, I was

met by the exclamation, "What! Australia and Europe the same! Nonsense: Australia, of all places, is the least like Europe; when you go there you pass into a wholly new country: everything is reversed there; the very leaves grow upside down; it is like visiting some great city of the dead!"

I grant it in some things, but not in all. Before I have done, I trust to prove that, in conformity with the principle I started with (that we must not judge of the fauna of one class by the fauna of another), it is not so in Beetles. It must be remembered that the present flora of Australia once flourished in Europe. Professor Unger may have occasionally allowed his imagination too free a rein, and the determinations of many of the fossil species by him and Professor Heer on which he based his conclusions in his 'New Holland in Europe' may be insufficient or erroneous, but the fact will not be disputed that the Eocene Flora of Europe has many points of correlation with the present flora of Australia. The resemblance no longer exists in the living floras of the two countries; in Australia alone has the old flora survived.

As regards insects, on the other hand, we know, from the researches of Heer and other naturalists, that the Beetle-fauna of Europe in the Miocene time was of the same type as the present Beetle-fauna of Europe and Asia. There are, unfortunately, no similar materials applicable to the Eocene epoch, nor has any one utilized the lesser materials that exist as Heer has done for the Miocene epoch; but from the fact that the insects derived from the still older beds of the Stonefield slate belong to the same stirps (I say so on my own authority and from personal examination), and that the whole of the Miocene materials yet made public, although drawn from several places and beds of different age, all belong to one fauna, it seems probable that the Entomological Fauna of Europe in the Eocene age was the same as in the Miocene. It is an assumption, but not wholly without warrant; and starting from it, my hypotheses is that, like the Eocene Flora in Australia, it has survived in its Eocene form down to the present day; only it has done so more perfectly in England than Australia, while the flora has only done so at all in the latter. In short, I should hold that if the researches of Sir Charles Lyell should end in carrying back the antiquity of man to the Eocene time, and if the ghost of an Eocene naturalist were to be allowed to revisit the glimpses of the moon, he would

find in Australia the type of both the plants and beetles very much as he left them. In Europe he would find only the beetles. Indeed I am strongly disposed to claim even a greater antiquity for our present Coleopterous fauna. Some may remember that when insect remains were first found in the coal-formations, the surprise was general among naturalists at finding them so small in size and so little different from those of the present day. They expected that they should have been as much beyond the existing type in size and splendour as the *Megalicthys* exceeds a Herring. Nature, according to the notions of those days, was in her youth in the Carboniferous epoch, and they expected something of the extravagance of youth in her proceedings. It now seems more probable that the Coleopterous fauna there was the same *in type* then as now, and that it has continued so in the region I speak of for all the intervening period, in accordance with the rule already referred to, that the lower we descend in the scale of organization, the more persistent is the general character of the forms of which life is composed.

It is not a reply to say that the Eocene flora, which has changed in Europe, being lower in the scale of life than the fauna, should have been equally persistent. It is not lower in the scale of life than insects. They are not in the same scale at all. They are on two distinct and separate ladders; and the Eocene plants, which have changed, were high up on their ladder (the very mammals of vegetable life), while the Eocene Coleopterous fauna was low down on its. It is to be borne in mind, too, that we have every reason to believe that the changes in condition of life since the Eocene epoch have been much greater and more frequent in Europe than in Australia; and if the plants are accepted as being more likely to change than the insects under altered conditions in life, it is in Europe rather than in Australia that a change in them was to be expected.

Of course, in what I have been saying, and shall further say on this subject, I speak of the Coleopterous fauna of Australia as a whole. In one sense it cannot be disputed that it is different from that of Europe. The species are not the same, and there are a multitude of peculiar forms; but the type, especially of what I regard as the more important test-groups, such as the hunting unintroductible species, is the same. The peculiar forms can almost always be traced back to enlargement or development of some microtypal form. Putting aside such exceptions,



the general facies is the same, and a large proportion of the genera are the same, and it will be still greater when we get rid of the feeling that the genera must necessarily be different, because they come from such a distant country. Some of the species are scarcely distinguishable from our own, and even the relative proportions of numbers of species and genera in different groups are the same.

My conviction is, that there has been certainly one, possibly two, great continental routes of communication between the northern and southern hemispheres, both now lying buried in the ocean,—the one at the bottom of the Atlantic, the other in the depths of the Pacific; and I hope, from an examination of the traces left on the ruined piers which mark the course of these ancient viaducts, to show the course that they took and the inhabitants that used them.

If any one, following in the steps of Sir Charles Lyell, objects to such a wholesale erection of continents on the ground of their magnitude, I have only to remind them of the vast extent of land which has appeared above water since the Tertiary epoch. Some drying up of the ocean during that period no doubt has taken place, but nothing sufficient to account for the immense tracts of country which have become dry land; and it is not a matter open to argument or discussion, but a mathematical necessity, that if land, previously below the water, comes above it, a corresponding quantity of land which was previously above it must then go below it.

Let us now turn to the three great stirpes, and pass each of them in review, trace their course, and determine their limits. I shall begin with the microtypal stirps (with which we are most familiar). It is the most extensive of the whole, being distributed over the whole world, with the exception of the Indian, African, and Brazilian regions; and even they, from various exceptional causes, have a greater or less tinge of it in their faunas. It contains some minor faunas, and these, again, a number of subfaunas. The Europeo-Asiatic region is one of these minor faunas, and of it the Atlantic islands, the Mediterranean, and the Mongolian are subfaunas. Taken as one fauna, the Europeo-Asiatic extends from the Azores east to Japan, the whole of that vast space being inhabited entirely by the same type and, for the most part, by the same species, a few only dropping off here and there, and being replaced by

others of the same general character. As to the Atlantic islands, the task is easy to decipher their relations; Mr. Wollaston has done it ready to my hand in his various admirable researches on their Coleoptera. It would be idle to vaunt the merits of his works to Fellows of the Linnean Society. Mr. Wollaston is one of our number, and we are entitled to regard his honours as gems in our own chaplet, if not laurels of our own growth. In interpreting the faunas of these islands, I have only to recapitulate the results of his researches; on almost every point I arrive at the same conclusions that he has done. He has removed all possibility of doubt as to the general identity of the faunas of the northern groups with that of Europe, and notably with the Mediterranean section of that fauna, or as to their individual identity with each other as members of one and the same subfauna. In the Madeiran group (see 'Insecta Maderensia' and 'Catalogue of Madeiran Coleoptera') he showed that out of 580 species, 314 are species already known on the Continent of Europe; true, he considers (in which he goes further than I would) that so many as 120 of these had been imported by man, or otherwise found their way to the islands; but, even after deducting these, he leaves 194 known European species aboriginally present, as against 266 endemic species. These endemic species, again, are all akin to the European forms, fit easily into their places among them, and all possess the facies of that fauna. I have already alluded to the want of reciprocity between Madeira and Europe in regard to any specialities they possess, and shall merely illustrate that remark by noting the fact that, although Mr. Wollaston credits Europe with a recent remittance of nearly the half of the European species, he acknowledges that no repayment in kind has ever been made by Madeira, not a single example of any of its peculiar species having ever found its way to Europe, except in an entomologist's box; and this, be it remembered, although the means of introduction have been at least as open on the return as on the outward voyage\*.

In the Canary Islands (see 'Catalogue of Canarian Coleoptera')

\* I know it may be replied to this that an unusual proportion of the Madeiran endemic species are apterous; but this, even although it were a good answer, would only account for the deficiency of a proportion equivalent to the relative number of apterous, as against winged species; but it is not a good answer even as regards them; for no one supposes that the introduction of species from the continent to Madeira has been by actual flight. It is floating wood and birds that are usually referred to as the vehicle or mode of transmission.

Mr. Wollaston next found that out of a total of 930 species, 224 are identical with Madeiran species, and, notably, that the same peculiar types which gave to Madeira the character of a subfauna, are also present there in force. The Cape-Verde Islands tell the same tale. Previous to the appearance of Mr. Wollaston's 'Coleoptera Hesperidum,' the usual belief among entomologists was, that the fauna of the Cape-Verde Islands partook more of that of the coast of Africa, nearest which they lie, than that of any other country. Mr. Wollaston has shown that this is a mistake. In his introductory remarks he says, "Our recent explorations in the Cape Verdes have shown their Coleopterous population to be so far more than I had anticipated on the Canarian and Madeiran type, that I am anything but certain that it would not be more natural to regard the *whole* of these Atlantic islands as characterized by a *single* fauna—unmistakably the same, even whilst necessarily differing as to many of its exact details (and through the fact of mere *distance*) in the more widely separated groups." From my own materials I rather inclined to the more general notion, and I therefore carefully tested Mr. Wollaston's conclusions by his data, and the result fully corroborated his view. Out of 275 Cape-Verde species, 91 were common to the Canaries, and 81 to the Madeiran group. The African element proved slight, as Wollaston said, and such as might fairly enough be referred to chance introductions from the opposite coast of Africa. The European element continues, as before, the staple, and a new phase of the peculiar endemic subfauna of Madeira is also a characteristic element of its fauna.

In support of the above statements, I shall merely specify one or two of the most striking of the types which are present in all the Atlantic-island groups under the same or similar forms. In Madeira the Heteromera are characterized by the presence of the endemic genera *Hadrus* and *Hegeter*, *Hadrus* having three species, *Hegeter* only one. In the Canaries, *Hadrus* has disappeared, but *Hegeter* has nineteen species, and in the Cape Verdes *Hegeter* is reduced to one, but a new form, *Oxycara*, has taken its place with ten species. In Madeira, the Curculionidæ are distinguished by a profusion of Cossonidæ containing new genera and new species in a marked degree. The same prevails in all the islands; so with *Acalles*, a small genus with few species in Europe, but with an especial redundancy in all the islands. *Atlantus* or



*Laparocerus* is another special new development confined to them, but present in most of them in greater or lesser numbers; thus in Madeira there are thirteen species, in the Canaries thirty-five species, none in the Cape Verdes, where, however, *Dinas*, a new Brachyderidous insect, similar to it in appearance, comes either to take its place or that of *Brachyderes*, which is also found in some of the Atlantic groups. In the Clavicorns, the remarkable genus *Turphius*, a consideration of whose relations would require space which cannot be given here, characterizes the Canaries and Madeira, as *Attalus* does in the Malacodermata.

As to the Azores, Mr. Crotch has completed Wollaston's work for him there. As a matter of sentiment, one would have liked to have seen the whole finished by Mr. Wollaston himself, as he had done so much and so well; but the naturalist is rather ungrateful in this respect, and cares little how he gets his knowledge, provided he does get it. Mr. Crotch's contribution therefore (Proc. Zool. Soc. 1867) is a welcome, as it is a trustworthy and careful, record of the Coleoptera of the Azores. His materials are, indeed, far less complete than Wollaston's in the other islands; but although imperfect as regards proportions, they sufficiently reveal the character of the fauna. Mr. Crotch records 213 species, of which 160 are European; and among those not European, he describes a *Turphius*, a *Laparocerus*, an *Attalus*, an *Acalles*, and a new member of the Cossonidæ—all sufficient indications of the Azores being a member of the same system as the other Atlantic islands. How the European character of this general fauna is to be accounted for, except on the supposition of a former connexion of them all with Europe, and how the presence of these special forms of the same subfauna in all the islands, and nowhere else, is to be accounted for except on the supposition that, after they were disunited from Europe, they were still united among themselves, it is for those who advocate the theory of dispersal by chance introductions to say.

The Azores seem to occupy nearly the western extremity of this ancient land; not far beyond them a deep valley, the deepest part of the Atlantic, intervenes between them and the coast of America. Up this the Gulf-stream scours, as it probably has done from early days far back in geological time; and if there is any place in the world to which we might reasonably expect a few waifs and strays to be brought by currents, it would be the Azores; and yet there are only three in this position, all Brazilian

and all insects which probably pass their larval state in timber; they are an Elaterid (a species of *Æolus*, *Æ. melliculus*), which is found all along the coast of South America from Rio to Demerara, *Monocrepidius posticus*, another Elater which is otherwise confined to the La-Plata district in South America, and *Teniotus scalaris*, a Longicorn. In the other Atlantic islands there is only one such introduction, a North-American Longicorn (*Clytus erythrocephalus*), which has been found on the Salvages. The supposed introductions to the Azores from the European side of the Atlantic are, according to Mr. Crotch, much more numerous. He divides the 170 European species of the Azores into "two groups (70 possibly indigenous and 101 almost certainly introduced by colonists);" and the mode of introduction assigned by him is (I know not on what grounds or with what *primâ facie* probability) their importation in earth at the roots of garden-plants. Certainly in this case the operations of the chance-introduction theory (three species coming with the current against 101 against it) would seem to call for some apology or explanation; but those who, like myself, reject that theory as capable of doing any thing more than furnishing accidental exceptions, will only see in the 101 supposed introductions (probably, but not necessarily, under deduction of a few cosmopolitan species) 101 natural denizens belonging to the microtypal stirps, and present in their natural capacity of legitimate descendants of the aboriginal heirs of the soil.

The only remaining vestiges which may be supposed to have formed part of this ancient Atlantis are Ascension Island, St. Paul's, St. Helena, and Tristan d'Acunha.

Of these, St. Paul's is, I believe, beyond its limits, and belongs to another fauna and another stirps, its fauna, so far as I know, being Brazilian; but more information is still wanted regarding it.

Ascension Island is a barren rock of recent formation, said to be almost without any fauna but what has been introduced by man within a hundred years or so; but it has never been thoroughly examined by any competent naturalist. What we do know of it has been picked up during brief flying visits by naturalists who, like Mr. Darwin, touched at its port, and did what they could in a limited time. The only animals recorded, so far as I know, are one Slug (*Limax ascensionis*), and, if we go by that, we must put it down as microtypal, and two Sea-shells (*Littorina milaris* and *Nerita ascensionis*), found by Mr. Cumming on its shores.

St. Helena, that great puzzle of naturalists, is a crucial test to my hypothesis of a communication between the northern and southern hemispheres by an Atlantic continent; if that link snaps, the whole chain will fall to the ground. It will, of course, not touch the evidence for a communication between the northern and southern hemispheres by the Pacific; but a microtypal St.-Helena fauna is vital to an Atlantic communication. I say that its fauna is certainly microtypal, and if so, almost necessarily a branch of the Atlantic type of that stirps; there is nothing else microtypal within reach for it to be attached to. Some three years ago Dr. Hooker gave an admirable lecture on oceanic islands \*, in which he discussed the origin of the flora of St. Helena, and on the whole seemed inclined to refer it to Africa. More in the spirit of "*audi alteram partem*" than from any settled conviction of my own, I wrote a reply †, in which I gave some reasons for thinking that it might more probably have been originally connected with and peopled from Europe, although also possibly connected at some period with Africa. More mature consideration and subsequent researches have confirmed my opinion; and the following examination of the character of its plants and animals will show the grounds on which I rest it.

In mammals, of course, nothing is to be expected. The only allusions to them that I can find is the statement ‡ that in cutting away the lava at Ladder Hill, many feet below the surface, small bones have been found, apparently about the size of those of a rat, and more particularly a small rib-bone entirely covered with an incrustation of stalactite. In what manner these have originally come there must ever remain a mystery: there is but one probable mode of accounting for it, on the supposition that the animal might have crept into a crevice of the rock and there died; for if a bed of lava in its liquid state had flowed over them, they would probably have been consumed, and would not have been found incrustated by stalactite. I find it also recorded in 'Baynes's Tour through St. Helena,' p. 119 (1817), that at the beginning of this century the "Manati or Manatee, Sea-cow or Sea-lion" existed in such numbers as to furnish employment for a fishery on it; and of course if the Manatee did exist there, it

\* Published in 'Gardeners' Chronicle,' January 1867.

† Published in 'Gardeners' Chronicle,' February 1867.

‡ See 'Proceed. Agri. and Hort. Soc. of St. Helena,' 1826, p. 30.



would be almost proof positive of former continuity of land with some country where the Manatee lived; for it is a herbivorous animal, and could neither have crossed from South America or Africa (where different species of Manatee still live) to St. Helena as it now stands. But it is not a Manatee; the observer from whom Baynes quotes says it is undoubtedly the Sea-lion of Anson, and gives a description of it, which shows that it must have been a species of Seal, doubtless that which he supposes (the Sea-lion, or *Phoca leonina*), which also occurs at Tristan d'Acunha, and yields plenty of oil, Carmichael mentioning that one animal there will give 70 gallons.

In ornithology there is, I believe, only one undoubted aboriginal land-bird, the *Charadrius pecuarius* of Temminck, a small Plover, named the Wire-bird (probably so called from its wire-like legs). It is so exceedingly close to the Cape *C. Kittlitzii*, that it has been confounded with it by ornithologists; until lately it was shown by Mr. Layard to be distinct. The Plover (and like the others this Cape species) is a migratory bird, consequently it is not difficult to suppose that it might, in the course of its migrations, have been blown off from the coast of Africa to St. Helena. But after arriving there it must have become modified by the altered conditions of life into the *C. pecuarius*, and, among other modifications, ceased to be migratory, for that bird is a constant resident in St. Helena all the year round.

Baynes, in his 'St. Helena,' speaks of the Grenadier Grossbeak (*Loxia orix*) as an inhabitant, and says it is locally called the Wire-bird. That it is so called is certainly a mistake; but if really an inhabitant of St. Helena, it does not seem a likely one to have been introduced; and if not introduced, then it certainly is microtypal, all the species of the genus being confined to the northern hemisphere. If the Canary has not been introduced, it would be another microtypal species, and more than that, a species belonging to the Atlantic subfauna. It is, however, said to have been introduced either intentionally or involuntarily by man. It is suited to the climate, and being a universal favourite of man, nothing seems more likely than that it should have been introduced by the escape of cage-birds; but I cannot learn that the belief rests on anything more than presumption and probability; and it may be said, on the other side, that if St. Helena was once a member of the Atlantic fauna, it is natural that it should occur there, and that, although so great a favourite and universal a com-

panion of man, it is not found naturalized in any other islands, notwithstanding that hundreds exist equally well adapted to it and equally inhabited by canary-loving settlers; a sufficient reply to which may be that there is no island exactly similarly situated in regard to man's arrangements, and that other birds of a similar nature have actually been naturalized there, the Java Sparrow and Indian Haverdavats being known to have been introduced, and the fact and date of their introduction being on record. They have thriven as well as the Canary, all three being as common as Sparrows. All, however, that I wish to do is to enter a caveat against taking the introduction of every microtypal species for granted. My own belief is that there are no aboriginal birds in St. Helena: perhaps its isolation was perfected before birds appeared in the lands with which it had previously been connected. Besides the above, the Common Fowl, the Guinea-fowl, the Pheasant, the Red-legged Partridge, the Peacock, and the Pigeon have all been intentionally introduced by man.

Governor Beatson gives the names of a very few of the sea-birds found on or about the island; but their range is so wide that they can scarcely be cited as bearing on this inquiry.

The Turtle is the only reptile mentioned as found at St. Helena, but no freshwater reptiles or fishes are known; at the same time it must not be assumed that none can exist. Although there are no streams, there is water, and there are terrestrial and marsh-shells (*Succineas*); and if the advocates of chance dispersal are correct in their reasoning, small fishes from distant lands might now and then be introduced by sea-birds. It is against their theory that they have not.

Governor Beatson (*loc. cit.*) also gives a list of seventy marine fishes taken at St. Helena; but as they are all designated by their local names, it is of no scientific value. Passing it, we have a thoroughly scientific and dependable, although smaller, list in two parts by Dr. Günther, in the 'Proc. Zool. Soc.' 1868, p. 225, and 1869, p. 238, made from a collection sent by Mr. J. C. Melliss, a resident in St. Helena, to whom naturalists owe more than to any previous observer for information as to its zoology. It will presently be seen that, besides the fishes, his collection of spiders and beetles supply the most important part of our material in these classes of animals. A copy of Dr. Günther's list will be found in the Appendix. It is not to be expected that the marine fauna can be applied in the same way as the terrestrial fauna to

the elucidation of the distribution of animal life, nor does it follow that because we see certain great divisions in terrestrial distribution, the same number and the same local distribution is to be found in them also; greater latitude and extent of range must be allowed to marine animals, and especially to fishes (the birds of the sea), than to land animals. The difference in their conditions of life in the sea is less than on land. Geological changes, such as the opening of the Isthmus of Panama and the Isthmus of Suez, have a more important bearing upon their distribution than upon those of land animals, inasmuch as the opening of a door to admit a new element is more important than shutting it after it has been already admitted. The knowledge that such events have taken place, however, enables us to reconcile the occurrence of marine animals in places otherwise difficult of explanation, as, for example, *Saurus atlanticus*, both at Madeira and Zanzibar. With the help of such aids I by no means despair of being able to show that a similar distribution, in the main, exists in marine animals to that in terrestrial; not exactly placed alike, but proceeding from the same causes, and the deviations traceable to the different treatment, conditions and events to which they have been subjected. Their distribution must be studied (and happily we have the means of doing so) more in connexion with their geological history and the fossil remains of their ancestors. It is not my present business to attempt to do this; and I shall not do more than indicate the line of argument which such considerations, at first sight, seem likely to lead to. Take the Sea-perches, the Percidæ (not merely the genus *Serranus* as now understood, but the group of allied genera of which it may be said to be the type), a group containing the first dozen species in Dr. Günther's list. Beginning in the Chalk with genera which are now all extinct, increasing in the Eocene, so that half of the genera now survive and are established in the Newer Tertiary, so that all the genera now existing were then present in England, that type would appear to be properly microtypal.

The sea-shells being for the most part dependent on the lands on whose shores they live, and therefore bound to them, are safer and more direct indications of the character of these lands than the fishes; and their own stirps generally corresponds with that of the terrestrial inhabitants, although, from the causes already alluded to, they are sometimes exposed to diverging influences from which the latter are free. We have as yet, so far as I know, no list of



the marine mollusca of St. Helena. Mr. Woodward in his manual mentions that Mr. Cuming collected sixteen species of sea-shells, of which seven are new. I cannot find that he has published these; probably Mr. Lovell Reeve may have done so in his 'Conchologia Iconica,' but I have not found them. Mr. Cuming's collection, however, is now in the British Museum; and besides there are in it a number of other shells collected at St. Helena, amounting in all, with his, to about fifty species. I have gone hastily over these under the kind and able guidance of Mr. Baird; and although I should be sorry to attempt anything like the determination of the species on the strength of such a hasty inspection, yet I think I may venture to give a list of the genera to which they belong, especially as I had Mr. Baird at my elbow to advise me when I was making my notes upon them. I accordingly give a copy of my memoranda regarding them in the Appendix. On looking at this, I think conchologists cannot fail to be struck with the correspondence of the distribution of the species found there with the Coleoptera belonging to my microtypal stirps. The range of many of them is put down in our books as world-wide, just in the same way as many of my microtypal genera of Coleoptera stand as cosmopolitan, merely because they are found at distant points of the microtypal range; thus *Lucina* is world-wide because it is found on the coasts of Europe, North America, the West Indies (a debateable frontier in all classes of animals), St. Helena, Tierra del Fuego, New Zealand, and Japan (all microtypal), and its fossil distribution corresponds so far as we know it. So *Mytilus* is world-wide. Mr. Woodward's localities are "world-wide—Ochotsk, Behring Sea, Russian Ice meer, Black Sea, Cape Horn, Cape, New Zealand." Others, such as *Venus*, *Venerupis*, *Corbula*, &c., have the same microtypal habitats, with the addition of the Indian Ocean, which may have been reached through the Red Sea when the ports of the Isthmus of Suez were open. The Patellidæ, the Rissoidæ, *Litorina*, *Cæcum*, *Cerithium*, *Chemnitzia*, *Eulima*, *Nassa*, all occupy microtypal ground. It seems to me, too, that the others, which are more widely distributed, will be found to be of older geological date.

The land mollusks are of course better authorities as to the character of the fauna of the island. We have, however, no list of them, although Mr. Benson has described some of the living and Edward Forbes some of the fossil species, and also made a few remarks on them in the Geological Society's Journal, 1852, p. 197,

and elsewhere. I have therefore combined these, and shall venture to add similar notes as to the genera and a few of the species from the British-Museum collection to those which I have given of the marine species. With one exception, they are all European-looking *Helices*, *Bulimi*, *Pupæ*, *Succineæ*, and similar forms; the exception is a large semifossil *Bulimus* (*B. auris-vulpina*, Reeve) which looks recent, but of which the animal has never been found; the nearest affinities of this species have been thought by some to be with *Polynesia*. The affinities of the other species have been thought by conchologists, I believe, to lean most to *Chili*; but this I apprehend to have arisen rather from a reluctance to look for this relationship in our own land. Divested of prejudice, it is difficult to conceive anything more close in appearance to the British species without being actually identical than they are, and any greater resemblance to the *Chilian* species I believe to be impossible; and if it did exist, it could not go for much, for the land-shells of *Chili* are microtypal too, many of the *Helices* and *Bulimi* being exceeding like those of *Europe*; and we all know that two things which are each equal to a third are equal to each other. Others have sought to account for this close resemblance to our own species by supposing them to be modifications of species brought in the earth at the roots of plants from *Britain*. The occurrence, however, of so many other species in other classes like our *European* species seems fatal to this view.

Of other sea animals, I have to mention two species of an *Annelid* (*Ditrupa*), also of a northern type.

There are four *Crustaceans* mentioned by Governor *Beatson*—*Shrimps*, *Crawfish*, *Stumps*, and *Long-legs*—which by their names and the character ascribed to them by Governor *Beatson*, viz. that they resemble our lobsters in taste and colour, suggest our northern species; but in ignorance of what they really are, we must pass them by.

The Rev. O. P. *Cambridge* has lately reported on a small collection of spiders made by Mr. T. J. *Melliss*, and described the new species in the *Zoological Society's 'Proceedings'*; and he says that so far as so small a number of species (only twenty-two), of which nine were new, may justify a general remark upon the character of the *Araneidea* of *St. Helena*, it appears to bear a thoroughly *European* stamp, one alone belonging to any genus not indigenous to *Europe*. Four, if not five of them have been

recorded as indigenous to Great Britain, three to Algeria, and three to Egypt. Among the new species Mr. Cambridge found "but little to denote a locality so near the tropics." (See extract from Mr. Cambridge's paper in the Appendix.)

Mr. Cambridge also records two Scorpions from St. Helena in the same collection, *Lychas maculatus*, Koch, and *L. americanus*, Koch (American but easily introduced).

The butterflies seem as badly represented as the birds; and I would recommend to the consideration of the advocates of introduction by chance dispersal the fact that the two classes of animals best provided with means of dispersal are precisely those which, along with the mammals, are least represented. I can find no published notice of any Lepidoptera in St. Helena. No specimens of any exist in the British Museum; and the solitary species that I can learn by inquiry to have been met with is the *Cynthia Cardui*\*. *Cynthia Cardui*, I need scarcely say, is what is usually called a cosmopolitan species; but in very many instances it will now be found that what have been called cosmopolitan forms are only microtypal, that is, found in every part of the world but those parts of India, Africa, and Brazil to which the microtypal stirps had not had access.

Until lately, our knowledge of the Beetles of St. Helena was limited to some twenty species or so. Mr. Wollaston has recently, however, considerably extended it, mainly through the researches of Mr. Melliss and Mr. Bewicke, and has published a catalogue (see 'Annals of Natural History,' 1869 and 1870) in which seventy-five species are enumerated. His observation upon these is as follows. "If we exclude from consideration the twenty-six species (above alluded to) which have *unquestionably* been brought into the island through the medium of commerce, and which enter into the fauna of nearly every civilized country, I need scarcely add that the St.-Helena list, as hitherto made known,

\* Prof. Westwood is my authority for this, and for the sake of preserving the information he gives, I quote what he says: "As to the insects of St. Helena, I am sorry to say that I can give you scarcely any information. In one of Dr. Burchell's cabinets was a drawer filled with insects from that island, but it unfortunately had no door and had been left neglected. After Dr. Burchell's death some wretched moths got into that particular drawer and devoured nearly everything. I kept all the fragments possible, and can determine some fourteen or fifteen species of common forms, *Coccinella*, *Sepidium*, *Necrobia*, *Cynthia Cardui*. It fortunately happened that the type specimen of the curious *Aplothorax Burchelli* remained intact."



possesses nothing whatever in common with those of the three sub-African archipelagos which lie further to the north—though the great development of the Curculionideous subfamily Cossonides is a remarkable fact which is more or less conspicuous throughout the whole of them.”

In this judgment I cannot concur; the list seems to me bristling with Atlantic affinities and points of correspondence. It is one of the very few instances in which I do not go entirely along with my friend Mr. Wollaston's conclusions; and I believe the difference on this occasion arises chiefly from our looking at the subject from opposite stand-points. I am looking at it as part of a larger stirps, he as an independent object. I am anxious that he and the large number of readers who, relying on his well-known judgment and acumen, will naturally accept his conclusions as their own *in fide parentum*, should see that I have strong grounds for dissenting from him; and I have therefore given in the Appendix a copy of the list of species recorded by him distributed into the stirps and faunas to which I think they belong, with full notes containing my reasons for placing them as I have done whenever any doubt seems likely to exist about the matter. On referring to this, it will be seen that, according to my view, the seventy-six species as yet recorded as inhabiting St. Helena (whether by Mr. Wollaston or others) are to be accounted for as follows. There are :—

1. Of doubtful identity and uncertain locality through the fault of the original describers ...	2
2. New endemic species which I have not seen either in nature or figured, and as to the affi- nities of which I am thus unable to form an opinion .....	2
3. Cosmopolitan or introduced, which, with two exceptions, belong to the microtypal stirps ...	13
	<hr/> 17

Deducting these 17 from the total 76, there remain 59 belonging to the different stirps as follows :—

South-American stirps .....	1
Indo-African stirps .....	2
Microtypal stirps, European branch...	56
	<hr/> 59

Of 56 members of the European branch of the microtypal stirps, I find 12 which have no greater affinity for one part of the European fauna than another, 3 which are new, but whose general affinity lies with species characteristic of the Mediterranean subfauna, 40 whose affinity is nearest to the fauna of the other Atlantic islands, and 1 (*Pristonychus complanatus*) which is generally distributed in microtypal countries, and which has hence been supposed cosmopolitan, but which in reality has not been found out of the microtypal bounds. Much of the weight to be given to this apportionment of the elements of the isle must depend on the value of my reasons which are given in the notes to the list of species in the Appendix, and to these I must refer the entomological reader. I may only say here that the instances which have had most weight on my own mind, are, 1st, the occurrence of a large *Carabus* (a hunting carnivorous genus limited to microtypal countries, which it would seem impossible to introduce except by continuity of dry land), which, according to the high authority of Prof. Lacordaire, has most affinity with species found in Syria (*i. e.* in the Mediterranean district with which the Atlantic Islands are otherwise most connected); 2nd, but of still more importance, the presence of species of genera which are particularly prominent or abundant in the other islands, as *Calosoma*, *Bembidium*, *Lamophælus*, *Anobium*, *Opatrum*, &c.; and 3rd, and of most importance of all, the presence of new forms allied to species already known as characteristic of or confined to the other islands of the Atlantic, as *Microxylobius*, *Nesiotes*, and *Notioxenus*, representing respectively the prevailing element of *Cossonus*, *Acalles*, and *Atlantis* in them. That a particular genus is represented (however critical this genus may be), when the representation is only by a single species, is not nearly so strong evidence of common origin as common exuberance of some particular form in both faunas under comparison; for the occurrence of a single species may be explained away when the presence of many defies dispute. And I rest as much on the occurrence of the typical character of facies as on actual identity of genus or species; for in the development of new forms Nature often refuses to go by our generic characters, and produces something exactly similar in appearance but with some deviation in what the systematist chooses to call important organs, a deviation which to his mind is fatal to generic identity, but to mine insignificant in the face of persistence of facies.

So far as the fauna goes, therefore, I have little doubt that the majority of zoologists will agree with me in referring it to the Atlantic subfauna of the microtypal stirps. But when we come to the flora, we have new light thrown upon the subject. It is said to be rapidly losing its original features; when Burchell visited the island, it was still nearly in its natural condition, and out of 169 plants collected by him, 40 were endemic and very peculiar, and of the remainder, a considerable proportion seem to have been of European type. Dr. Hooker, in his lecture on Oceanic Floras, says of this, "Dr. Burchell's collection includes 169 flowering plants, but most unhappily he has not indicated which are *bonâ fide* natives and which have followed the track of man and animals introduced by him, and which have become quasi-indigenous or naturalized. Some years after Dr. Burchell's visit, however, an eminent Indian botanist, Dr. Roxburgh, visited St. Helena, and drew up a catalogue of the indigenous, naturalized, and cultivated plants then existing, carefully indicating the truly indigenous ones that were then surviving." This flora of Dr. Roxburgh's, however, is imperfect, some of Dr. Burchell's species (now in the Herbarium at Kew) not being included in it, probably having become extinct in the interval between his and Burchell's visit; and a strong desire is felt by those interested in the subject that a fresh flora of St. Helena should be published by some competent botanist. Dr. Hooker's talents, position, and acquaintance with the subject point him out as the most fitting person to do so: and I trust the general wish that he may undertake it will lead to its own fulfilment.

As our knowledge of the flora stands, however, I believe the actual facts which have been ascertained regarding it are that it contains, 1st, a considerable number of plants known to have been introduced from various countries, but chiefly from Europe; 2nd, a considerable number of European species or genera which are not known to have been introduced, but which are taken for granted to have been so on account of their European habitat; 3rd, a small proportion (but still too large a proportion to be accounted for by chance dispersal), the affinities of which are clearly with the Cape flora. Dr. Hooker's conclusion to this effect is thus stated in his lecture above referred to:—"From such fragmentary data it is difficult to form any exact conclusions as to the affinities of this flora; but I think it may be safely regarded as an African one, and characteristic of Southern extra-tropical Africa.



The genera *Phylica*, *Pelargonium*, *Mesembryanthemum*, *Osteospermum*, and *Wahlenbergia* are eminently characteristic of Southern extra-tropical Africa; and I do not find amongst the others any indication of an American origin, except a plant referred to *Physalis*. The Ferns tell the same tale; of twenty-six species, ten are absolutely peculiar; all the rest are African, although some are also Indian and American." On this sentence, while I implicitly accept its conclusions, I shall only remark:—1, that Mr. Baker, in his admirable paper on the geographical distribution of Ferns, seems to me to be a little more favourably disposed to America in his estimate of their relationship; 2, that some of the African species, as *Banksia* and *Protea*, may have an Australian significance as well as an African—not that I think that either touches Dr. Hooker's conclusion, but in trying to sum up impartially I do not wish to overlook any point; and 3, that there is besides what may be called an under layer peculiar to the island itself, and found nowhere else on the face of the globe, such as arboreal Compositæ (tree-daisies, as it were). Dr. Hooker regards these as too abnormal to have their affinities with the plants of neighbouring continents made out. I cannot think so if he will lend himself seriously to the work.

The general result which I draw from the whole flora is, that we have here a compound flora certainly two deep, possibly three deep. We have, in the first place, I believe, a genuine natural Atlantic, that is, European flora; for in the face of the decided testimony to that effect given by the fauna I cannot accept Dr. Roxburgh's conclusions as to the supposed introduction and naturalization of every species having a European habitat. If they can be proved to have been introduced, good and well; but I object to take the thing to be proved as part of the proof. And, in the next place, I believe we have the traces of an older African flora (why I call it older I will explain when I come to speak of an ancient connexion between Patagonia and South Africa); and I believe that both are due to actual continuity, however circuitous or interrupted, with the respective countries the impress of whose floras they bear.

Before leaving St. Helena, I have just one other argument to adduce in support of its former connexion with the other Atlantic islands, and that is the fact, which has only recently been ascertained, or, at any rate, only recently laid down in our maps, that there is a long band of elevated submarine bottom running north

from St. Helena to the Cape-Verde Islands, and embracing in its course Ascension Island and the shoal ground on the equator.

The next trace of a microtypal element in the southern Atlantic is the island of Tristan d'Acunha; and in obedience to the natural train of thought, I shall begin with its flora, as I have just left that of St. Helena. I should have liked to have given in the Appendix a copy of the 'Flora St. Helenica,' partly in illustration of what I have said regarding it, and also for the purpose of contrasting it with a similar list of the flora of Tristan d'Acunha given by Capt. Carmichael in the 12th volume of the 'Transactions' of this Society; for we find the same elements in both,—a mixture of European and African types in nearly the same proportion. The St.-Helena list is rather long, and I hope may soon be supplied by a better; the Tristan d'Acunha list is short, and an abstract of it may be convenient, and one is therefore given. The only shrubby plants in the island (trees there are none) are *Phylica arborea*, and either one or two species of *Empetrum*. *Phylica* is an African genus represented by two species in St. Helena; and its occurrence in both St. Helena and Tristan d'Acunha furnishes at least a presumption in favour of the two islands having once been in communication with each other and with the African continent. *Empetrum* (our Crowberry), on the other hand, is, as every one knows, a most characteristic type of the Scandinavian flora, and not less so of the Magellanic and Antarctic Flora generally. So is the genus *Chenopodium*, wild species of which also occur in both St. Helena and Tristan d'Acunha. The genus *Pelargonium* has also species in both islands: it, notwithstanding the presence of a straggler in Syria, is unquestionably African, its species in that continent being numbered by hundreds. It seems of no consequence that, as Dr. Hooker informs me, the Tristan-d'Acunha species belongs to a different section from the St.-Helena species. We should have expected that they would be different; the greater the deviation the longer the probable period since they started from common parents, and the stronger the presumption in favour of my view of the connexion with Africa being very ancient. But what must strike every one most in running their eye over Capt. Carmichael's list is the resemblance to our own flora. We there see *Ranunculus*, *Rumex*, *Cardamine*, *Atriplex*, *Gnaphalium*, *Apium*, *Carex*, and similar genera.

Capt. Carmichael does not say much about the insects, but what he does say tells the same tale as the plants,—“Three small species of *Curculio*.” Thus we have, again, small *Curculios*, probably similar to those which have given a character to the Coleoptera of the other islands; with them four *Phalænas*, the old genus for the typical British Moths—a *Hippobosca* (*qu’ allait-il faire dans cette galère*, where were neither horses nor other land quadrupeds for them to feed on?),—two species of *Musca*, and a *Tipula*. Of Crustaceans, an *Oniscus*, an *Astacus*, and a *Cancer*, all characteristic types of the European fauna. Of the land-shells we may say the same; we know only two, both species of the genus *Balea*, a genus allied to *Pupa*, of which species have nowhere been met with elsewhere, except in Hungary, Norway, Porto Santo (one of the Madeiran group), and New Granada. The Norway species has also been found on the highest peak of Porto Santo. The only locality not entirely microtypal is New Granada; and of it the mountainous part is microtypal, the plain Brazilian. In which of these the *Balea* occurs I do not know; but the probability is in favour of the mountains, because the climate of the lower parts is so dangerous that it is almost entirely in the mountains that collecting has chiefly taken place.

The sea-shells and other marine objects recorded by Capt. Carmichael all have the same microtypal tinge. *Chiton*, *Cardium*, *Patella*, *Buccinum*, *Sepia*, *Echinus*, and corallines sound marvellously like the contents of one’s basket after a rummage along the coast in our own country.

Have we now reached the southern limit of the ancient Atlantis? Is Tristan d’Acunha its outmost cape? Has it stretched for interminable space to the South Pole without leaving an indication of its existence? or has it trended off to the Falkland Islands and South Shetlands, and joined Tierra del Fuego, and possibly Patagonia? If there were no other way of accounting for the microtypal character of the fauna and flora of South America south of the Plata, all to the south of it being microtypal, one might feel disposed to assume that it did; and had we only the flora to go by, I should probably adopt that view, for we have in Tierra del Fuego and the other antarctic islands the very types of European plants that we have noted in Tristan d’Acunha—*Empetrums*, *Ranunculus*, *Cardamine*, *Wild Celery*, &c. &c. But I shall presently show that there was another route by

which a communication between the arctic and antarctic hemispheres was effected, and that the affinities of the Coleoptera of Tierra del Fuego and Patagonia rather point to that being the channel of communication so far as they were concerned. It may probably have been the case that there was interrupted communication between Tristan d'Acunha and these antarctic islands, which in their turn had interrupted communication between Cape Horn, New Zealand, and Australia.

Leaving this question for future solution, I shall now revert to the European fauna, of which we have only touched on the most western limit, and trace it eastward. I have already said that the whole fauna from the Azores to Japan was one and the same. No better proof of this can be given than a comparison of the list of species from one end of the continent to the other. We have no complete lists of the Coleoptera all over the country, our lists of the east of Asia being comparatively imperfect, but they are still sufficient to illustrate the identity I desire to point out. We have a list of those found by Schrenck in Amourland and Eastern Siberia, made up by Motschoulsky, and published in Schrenck's '*Reisen im Amurlande*'\*. We have also some similar data regarding the Coleopterous fauna of South-east Siberia, collected by Raddé in his explorations; but this is very imperfect, and relates more to genera than species. Motschoulsky's list of species found both in Amour and Eastern Siberia contains 810 species. The portion of these found in Eastern Siberia is not, however, so applicable to my present comparison as the list of species found in Amour, which extends to the extremest limit of Asia. The number of species from it, enumerated in the list above referred to, was 340; but a fuller list was published afterwards by him†, which contained 564 species; and I have made it the basis of a Table, which will be found in the Appendix, from which the range of the species composing it can be ascertained. As it does not forward this inquiry to know what particular species are limited to Amour, I have left out all in that position, except when they represent a genus not otherwise present, when I give

\* I may here say, parenthetically, that Count Motschoulsky's tendency was certainly not to diminish the number of new species, but rather to increase them, so that any insect that he admitted to be the same as one previously described may, without much doubt, be accepted as really such.

† '*Catalogue des Insectes rapportés des environs du Fl. Amour, depuis la Schitka jusqu'à Nikolaëvsk, examinés et énumérés par V. Motschoulsky, Moscôw, 1860.*



one species of the genus to show that it is present. I have also added a few on the authority of Raddé and others from South-east Siberia. The total number in my list thus purged and augmented is 382; but adding the number of the endemical species, of which I have not given the names, we start with 608 species known to inhabit the extreme east of Siberia.

Of these the numbers are, in

Amour .....	579
Dauria .....	297
Western Siberia, or the districts of the Ural Mountains...	227
North and Mid-Europe, as distinguished from East or West Europe.....	213
East Europe as represented by France and Belgium .....	184
Britain .....	133
The Madeiras .....	10
The Azores .....	7

To which I may add, in anticipation of what I must presently say in speaking of North America,—

On the western side of North America .....	8
On the eastern side of North America .....	23

The details will be found in Table VII. in the Appendix.

The diminution in identity of species as we go further from our starting-point (wherever we begin) and their replacement by new strains is, it will be seen, exceedingly gradual and equal, and the proportion of identical species persisting through the immense stretch of country embracing Asia and Europe very remarkable. But what is of still more importance in this inquiry is the identity of the genera. Using the word in its large sense, the same genera are spread over the whole region in question; used in the more restricted sense, adopted by modern naturalists, a similar replacement of one form by another allied one, which we have seen occur in species, takes place also in these groups of species. Thus, in recording the species from the Amour, Motschoulsky has thought it necessary to propose a number of new genera for the new forms; and the proportion of these to the old genera found there was about a fifth. He records 239 genera, of which 35 are new. And, curiously enough, this is very close upon the numbers which Wollaston has turned out in his work at the other end of the string on the Coleoptera of Madeira: he records 236 genera, of which 44 are new.

The same fauna goes southwards through Mantchouria and Korea into China; and about Shanghai we get to the line where it meets the Indo-Malayan fauna.

We have a tolerably fair (although far from complete) notion of the Coleopterous fauna of that part of China. Mr. J. C. Bowring procured important material from that quarter. Mr. W. W. Saunders has also made some of its species known; and latterly Mr. C. W. Goodwin, Assistant Judge of the Consular Court of Shanghai, has sent some important collections made in the immediate vicinity of that city to one of our London entomologists, M. de Rivas, who, I trust, will ere long give to entomologists a catalogue of the species. In the meantime these materials (which I have had the advantage of studying) show that the Coleopterous fauna of Shanghai is a mixture of a few Indo-Malayan types (such as *Copris molossus*, *Euchlora viridis*, *Cerosterna punctata* variety) with a mass of smaller species mainly belonging to the Europeo-Asiatic fauna; some identical with European species, the majority new species of the same type. A small collection of Coleoptera made by Dr. Collingwood at Formosa, which he has been kind enough to show me, exhibits the same mixed fauna, and of nearly the same kind and proportions.

An exactly similar intermixture occurs on the opposite coast of Japan; but what is most remarkable is, that although it occurs in the Beetles, Butterflies, Bugs, &c., it does not occur in the Hymenoptera. The great majority of the Beetles are of the Europeo-Asiatic type, and a certain proportion (as in Amour) are identical with, or only very slightly different from British species; the minority consists of species of the Indo-Malayan type, and indeed of the identical species which occur at Shanghai (*Copris molossus* and a variety of *Cerosterna punctata*, being two of the most prominent insects in both). But the Hymenopterous fauna is not of this mixed character; it is entirely Chinese. Mr. Frederick Smith, our first authority on the Hymenoptera, and who, from his position in the British Museum, has unusual opportunities of observing collections from all quarters, tells me that he has never seen a Hymenopterous insect from Japan of other than the Chinese type. It is the only class of insect, so far as I know, in which this deviation from the typical character observed in others occurs. Why should this be? Is there any peculiarity in the life of the Hymenoptera which can account for it? The only one I know of is, that one large section of them

(the Bees) are dependent on flowers for subsistence in the larva state; and supposing the cold of the glacial epoch to stop the flowering of plants in Japan without killing the plants, the bees might be exterminated while the other classes still survived. Were Japan, therefore, separated from the mainland, so that on the restoration of a milder climate no fresh supply of species could be received from the north, and united to Southern China, so that it received its new inhabitants from it, and then finally separated from it as it now stands, we should perhaps have an explanation of the actual phenomena as regards bees; but there are other Hymenoptera to which this explanation will not apply, and further research may show that the exclusion of northern types is not so rigorous as at present appears. At any rate, it seems to me that if the whole earth might be replenished by chance colonization, then the presence and absence of particular classes of insects in Japan is without explanation.

I presume it will not be necessary for me to show that the same distribution prevails throughout Europe and Asia in every class of animals; Dr. Scater was the first to do so in the birds, I have elsewhere done the same for the mammals. Dr. Günther has done it for reptiles, Gabriel Koch has done it for the Lepidoptera, Meyen and Hooker for plants. In fact every person is at one upon it, each in his own speciality.

The Europeo-Asiatic Beetle-fauna\* does not stop even at Japan; it passes over into North America by Behring's Straits, or rather, I should say, it is found in North America on the other side of Behring's Straits. In Russian America we have a fresh crop of Europeo-Asiatic forms, genera and species; and here another noteworthy circumstance presents itself. It is generally taken for granted that there is a uniform homogeneous arctic fauna which extends all round the arctic circle. It is so, and it is not so. It is so on the large scale, but not so on the small. The arctic fauna is subject to the laws of spreading by continuity and stoppage by barriers just the same as any other fauna. I have elsewhere endeavoured to show that the mammalian fauna of Greenland is Europeo-arctic as distinguished from Americano-arctic. I maintain that the homogeneity of a fauna

\* I was unable, in my 'Geographical Distribution of Mammals,' to adopt Dr. Scater's terminology of Palaearctic, Neoarctic, &c., because we did not agree in the extent and limits of our regions; and now, of course, in this paper I can still less do so, as a principal effect of my hypothesis, if it be sound, must be to still further break down their limits and destroy their solidity.

depends on other causes than uniformity of condition of life within its limits. I cannot doubt that if there had been an isolated communication between the Indo-African districts and the North Pole, we should there have had a fauna related to and developed out of that fauna, and wholly distinct from the other faunas of the arctic regions. It is continuity of soil or freedom of intercommunication which has produced the present uniformity of fauna in the arctic regions; but where minor interruptions exist, or old barriers or conditions equivalent to a barrier formerly existed, there are also subdivisions in the character of the fauna, and in the position of these minor divisions we see the operation of these laws and are able to trace the existence and former position of the barriers. Thus we find two minor subfaunas in Arctic America, an eastern and a western one. Two causes may have produced these. One of these may have been the sea which, it can scarcely be doubted, formerly existed between the Gulf of Mexico and the Polar Sea, in the line of the Missouri and Mackenzie rivers; another may have been that the ground now occupied by one of these subfaunas was under water at a later period than the other, so that it was peopled at a different date from it. Probably both contributed to produce the present arrangement of the subfaunas to the east and west of the Mackenzie River. That there was a barrier there, and that that side was still supplied with the same general type (though with minor deviations), is to be explained by their having received their species from the same general stock, but coming to it from different directions, the one from the east, the other from the west. That the minor differences to which I allude are, in the case of North America, to be referred to this cause, and not to mere gradual increase of variation arising from increase of distance, seems to be a legitimate inference from the fact that while the whole of the north of North America, without exception, belongs to the Europeo-Asiatic type, there are a number of European genera which occur in North-east America, and not in North-west, and *a few which occur in North-west, and not in North-east America.*

In the Appendix I have given a list of genera of Coleoptera which inhabit both sides of the Pacific, and do not occur in the Atlantic States of the American Continent, and also of a list of some species of other genera, similarly distributed. These are almost literally taken from my friend Dr. Leconte's Reports in



the 'Pacific Railroad Reports,' 47th parallel, and on the Coleoptera of Kansas and Eastern New Mexico, as verbally corrected by him for me down to the most recent date, and only one or two being added by myself. Some of the genera or species in these lists may yet be met with in Eastern America; but after making allowance for this, enough would seem still to remain to warrant us in holding that a certain proportion of these must have reached America *viâ* Siberia, and that, in like manner, most of those in the Eastern North Atlantic States have probably originally come *viâ* Europe and Greenland.

North America has no special fauna or flora of its own. That which it has is a mixture of the microtypal and Brazilian stirpes intermingled with fresh importations of different dates, and modified by the advance and retreat of the glacial epoch; but, on the whole, the preponderating element in its fauna is the microtypal. What I am now pointing out with regard to Beetles may be traced to a greater or less extent in every branch of zoology and botany. I could go over each, pointing this out; but I will wait until the fact is disputed. Its origin is of very old date, the elements now respectively found in Europe and America having been already settled in each country before the Miocene time. Professor Heer's admirable papers on European fossil Tertiary insects give us the means of inferring this, and at the same time furnish arguments against his and Professor Unger's scheme of the Miocene *Atlantis*, which they held to have united Europe to America in the line of the Azores, and which, they think, served as a bridge for the intercommunication of the plants and animals in the two continents. That there was formerly a continent in the Atlantic is, I think, proved to demonstration by the facts already mentioned regarding the faunas of the Atlantic Islands. But that it reached America is gain-said not only by the facts adduced in Professor Oliver's able paper on the subject, published in the 'Natural History Review,' and by those of other able naturalists, a *résumé* of which I have already given elsewhere ('Geographical Distribution of Mammals'), but by the examination of Heer's lists of species, to which I am about to refer. If the reader will turn to the Appendix, he will find in one of the Tables a list of all the genera of Professor Heer's 'Miocene European Coleoptera,' with the exception of a very few, which he could not refer to known genera, and which I have omitted. In that list I have noted in columns

opposite to each genus the different countries in which they are now found; and the result shows, first, that all these Miocene genera, excepting such as are universally distributed, are now confined to my microtypal regions; and, secondly, as regards Europe and America, that among them are plenty of genera which now inhabit both Europe and America, but not one that now inhabits America and does not inhabit Europe, while there are a few well marked and characterized forms, as, for example, *Pælobius*, *Capnodis*, *Microzoum*, and some others of less marked distinction, as *Perotis* and *Eurythyrea*, which now inhabit Europe and do not inhabit America. This is as strong evidence in kind (I do not dispute that it might be stronger in quantity, that is in number of forms), but it is as strong in kind as a fossil collection from one country alone could give, that the same distribution which prevails in these two continents at the present time, prevailed already in the Miocene epoch. The genera which are now peculiar to Europe were then peculiar to it, and, consequently, the inference is strong that no communication between the two countries has ever existed since the days when these fossil insects were in life. If we had an American collection of the same age in which types now peculiar to America were found, the evidence would of course be still stronger, but it would be repetition of what we have already observed in Europe. The same relations between the American and European Miocene species are to be found in other classes. I give a somewhat less elaborate (as regards number of regions) list of the distribution of all the other existing genera of insects recorded by Heer and Krantz, not only for its bearing on this inquiry, but in the expectation that it may be convenient and useful to other students of geographical distribution to have such a list at hand. The Hemiptera have been gone over for me by Mr. Dallas, our first authority on that branch, and the table and notes embrace the information derived from him, although he is not responsible for it all, his attention having been only specially requested to Europe and America. In that table it will be seen that the Miocene genera *Prostemma*, *Nepa*, and *Diplonychus*, and in the Homoptera the genus *Tettigometra*, are now found in Europe and not in America, and that one or two instances where the reverse seems to be the case are due to modern alterations on the genera used by Heer. In the Diptera it will be seen that all the genera are both American and European.

The above are not the only points in which Professor Heer's Miocene species lend important help to the student of geographical distribution. They are of essential assistance in determining the southern limit of the microtypal stirps in Europe and Asia, and whether some of the forms which are found in the southern part of the European range really belong to it, or are immigrants from the African or Indian region lying to its south. The South-European fauna is composed partly of the same species as that of the districts more to the north, partly of distinct species of the same genera, and partly of what may be regarded as modified forms of the same general stock, but having a considerable effect in altering the facies of the fauna. Besides these, there are a few (perhaps in all not more than ten or twelve) species which have probably sprung from the African stirps, and established themselves in Europe by immigration. The southern limits of the fauna of this region, which extends along the bed of the Sahara onwards to the Caspian and Mongolian Steppes, are the deserts of the Sahara, which cut it off from Europe, and the Himalayan range, which divides it from India and China. As regards the Sahara, it is its southern border which is the limit. Its bed seems to have been raised by a force operating from the north. The strata, abutting on the Atlas mountain-range, rest inclined on its flanks as if tilted up by it. The effect of this elevating force operating in the north would, of course, be to raise the part of the Sahara nearest it first out of the water; the last vestige of the sea would be at the south, consequently the bed to the north would be first colonized, and it could only be so from the north. The facts of geographical distribution quite correspond with this view. The fauna and flora of the desert is Mediterranean, not Senegalese.

Returning to the Asiatic terminus of the microtypal stirps, let us now endeavour to trace its further course. The genus *Blaps*, which is a characteristic feature in the Coleopterous fauna of Central Asia, will furnish us with the means. It may be taken as a representative case applicable to other species also, although it certainly is the most striking instance which occurs to me. Upwards of 100 different species of *Blaps*, out of a total of about 150, have been described as inhabiting the country between Southern Russia, Mongolia, and Mantchouria. Now if we cross to California in continuation of the same line we have not *Blaps*, but we have *Blaps's* brother, and he has been a twin. We have

*Eleodes*, its perfect counterpart and representative; and it is to be observed that while the facies of the species actually inhabiting California is entirely that of *Blaps*, a number of species which are found in Kansas and on the eastern flanks of the Rocky Mountains have a somewhat different facies; and I should add that the supposition that these are stragglers from the Californian shores is strengthened by the fact that the genus does not occur to the east of the Missouri: other Heteromorous forms, reminding us of Mediterranean and Asiatic species, occur in California, and the whole of the north-west of America has a greater preponderance of the microtypal stirps than perhaps occurs east of the Rocky Mountains. The Brazilian element is less sensibly present, such Brazilian genera as *Passalus*, *Dynastes*, *Monocrepidius*, *Macroductylus*, *Dichelonycha*, *Phanæus*, *Gymnetis*, &c. being absent in California, although present in the Eastern States. M. Candèze, in his work on the Elateridæ, notices that *Meristhus scrobinula* is found both in Mexico and China, and adds that he has found other species common to these countries, notwithstanding their distance from each other (Candèze, 'Elateridæ,' i. 165). Other facts in other branches of natural history lend strength to the idea of a former communication having existed between Asia and California. For example, in Mammals, there is a peculiar genus of Moles, *Urotrichus*, which has not been met with anywhere but in Japan and California. In plants, the botanist will remember that the Coniferous subgenus *Pseudostrobus*, so abundant in Mexico and California, in the Old World reappears in Japan, and only there. The Menzies and Douglas type of Spruces does the same, species almost identical with them occurring in Japan. The *Chamæcyparis* of California is only another name for the *Retinospora* of Japan; and among herbaceous plants similar relations can be pointed out. In the Sandwich Islands, again (so far as we know, which is not so much as we wish), which from their position may probably have been part of any northern land which formerly existed in the Pacific, as well as, at some period antecedent or subsequent, a part of Polynesia, the same character of fauna is present. Among the Lepidoptera we have *Sphinx cingulata*, Linn., or what is scarcely distinguishable from it, it in its turn being the scarcely distinguishable American representative of our own British *Sphinx convolvuli*. The only Coleopterous genera which I know from them are *Anchomenus*, *Colymbetes*, *Agabus*, *Hydrobius*, *Hete-*



*rophaga*, and *Dryophthorus* (*Calandra*), all of which are certainly microtypal.

Next step to the south of California comes Mexico. It also is largely supplied with *Eleodes*; and although some of the finest and showiest non-microtypal Coleoptera in the whole world come from Mexico, they have no bearing on this part of my inquiry; for they come from parts of Mexico which are in direct communication with another stirps, the rich Coleopterous fauna of Brazil and Venezuela; and the vast multitude of small European-looking species which occur on the high lands and western side is quite sufficient for my purpose. The collections made by Truqui in Mexico show this thoroughly microtypal character in a very marked way, Staphylinidous genera, such as *Falagria*, *Homalota*, &c., abounding. Mexico, being a sort of halfway house between Europe and Australia, might be expected to contain species both from the north and the south which have got thus far. *Eleodes* is an instance of this from the north, *Philonthus* another; both reach as far as Chili, but not into Australia. *Zopherus*, on the other hand, is an instance of a species which occurs in Australia, and runs up into Mexico, where it is in strength, and goes even a little further. Mexico may, indeed, have been its starting-point, but the connexions and relations of it and the allied genus *Nosodendron* decidedly indicate a separation between the eastern and western type of both; and the western type extends into Australia and New Caledonia.

Between Mexico and Peru, west of the Andes, there is a considerable space, as to which more information must be obtained in every branch of natural history before we can satisfactorily dispose of this question. There have been many collectors in it, but they have usually hurried to the interior and across to Columbia and New Granada; and I have seen no coast-collection of Coleoptera, nor do I know of any published lists. From the mountains themselves we have, however, received very considerable collections. Thanks to Professor Jameson, of Quito, we have a fair knowledge of the Coleopterous fauna of its neighbourhood. That of Bogota also is pretty well known. From these I can say that they consist of a mixture of microtypal with Columbian forms, in which the Columbian predominate; but the microtypal is represented by undoubted members of that stirps, such as *Graptodera*, *Philonthus*, small Harpalidæ, &c. Of other classes of animals the birds are best known, through the exertions of Messrs. Fraser and Salvin;

and, as it seems to me, there is a similar mixture of stirps in them. In such an inquiry as this, however, birds would require a special examination for themselves, their power of flight, and, still more, their migratory instincts, complicate their distribution so seriously. To do so fairly, the main distribution would require to be taken, in all doubtful cases, as the test of the stirps, leaving exceptional deviations out of view, whether they can be accounted for by exceptional causes or not.

Passing southwards to Peru and Chili, the number of Europeo-Asiatic genera diminishes, but the general facies still remains. The Chilian species in many cases belong to European genera, and the general facies is of the same character. *Blaps* still shows itself, only it has now passed out of the form of *Eleodes* into that of the smaller *Nycterinus*. The genus *Carabus*, which was lost in Mexico, has here retained its footing; it is found in great beauty in the Chilian Andes, although very limited in number of species. *Carabus* is a genus almost entirely confined to Europe, Asia, and North America. Africa proper has it not; India has it not; and, although it goes against my argument, I must in honesty add Mexico appears not to have it. St. Helena, the Chilian Andes, and Australia are the only places in the southern hemisphere where it occurs. In Australia the genus has undergone some modification (into *Pamborus*), and in St. Helena (into *Haplothorax*), but still true scions of the *Carabi*, and bearing all their facies. The *Feroniadae*, too, which form a very characteristic element in the European and American faunas, are fairly represented in Chili, strong in Australia, and absent from Brazil, Africa, and India, except in places which of themselves suggest that they are emigrants from over the border. Such are the species in South America from the mountainous parts of Columbia, or in India from both sides of the Himalayas; *Pristonychus complanatus*, a European species, seems to beat all others in the possession of "an undergoing stomach to endure whatever may ensue." It occurs in Chili and also in the Canaries and in St. Helena. Another somewhat remarkable form is the genus *Thalassobius*, beetles which live under high-water mark; it belongs to the Trechidæ, which seem peculiarly adapted for trying strange modes of life, and peculiarly open to the impression of altered circumstances in them, turning into *Anophthalmi* of various kinds in dark caverns, into *Æpus* and *Thalassobius* under the sea. *Æpus* is the form they have taken under high-water mark on the coasts

of Europe, *Thalassophilus* at Madeira, *Thalassobius* at Chili; and the late Mr. Wm. Sharpe Macleay informed me, in a letter written not long before his death, that he had found a similar species on the shores of Australia. Not then having my eyes open to the true significance of the occurrence of those species in these localities, I considered that probably they would be found on all coasts. I do not expect this now. I imagine they will be found confined to the coasts of the lands to which my microtypal stirps extends; and, in point of fact, they have not as yet been found anywhere else.

The distribution of the blind-cave Coleoptera is very remarkable. In the caves where they occur in Europe (chiefly in Carniola, Hungary, Corsica, and the Pyrenees) almost every new cave produces a new species closely allied to, but distinct from, those in the nearest caves; but more remarkable still, the Mammoth Cave of Kentucky produces a species of *Anophthalmus* so close to the Carniolan species that it is only on examination that one sees they are distinct. The *Anophthalmi* and their allies are carnivorous, hunting beetles, and, as I have just said, their parent type seems to be *Trechus*; but the same thing occurs with another totally different type, *Adelops*, a clavicorn allied to *Catops*. Not only in the different caverns and also under moss and in dark places do different species of this occur, but again in the Mammoth Cave of Kentucky it reappears side by side with *Anophthalmus* in an all but identical form there.

And here, while upon the cave-insects, I may remind the reader of the blind Reptilia and Crustacea of which allied forms occur in the European and American caves; and I would also draw their attention to a lately described form of cave-locustrian which has a distribution still more in accordance with the range of my microtypal stirps. One species occurs in caves in Europe, another in America, and a third in a limestone cave at Collingwood, Middle Island, New Zealand. They were at first described under different generic names, it being supposed, probably from the distance of their localities, that they must be distinct; but Mr. Scudder, the eminent American orthopterist, has shown that all three belong to one genus, which he has named *Hadenæcus*. Although they inhabit the deepest parts of the caves, they are not blind, but have the long legs which seem characteristic of the *Anophthalmi* and Cave-Araneidæ.

In the Elateridæ the characters are slender and often artificial, and so not well adapted for the elimination of questions of geo-

graphical distribution ; but even in them we can satisfactorily establish the presence of the microtypal element in microtypal lands, and its absence elsewhere. Take the genus *Elater* proper. In it, of fifty-three species, twenty-three occur in the Europeo-Asiatic district, twenty-five in North America east of the Rocky Mountains, two in New Holland \*, and if we unite to it the genus *Grammophorus*, which has quite the facies of *Elater* and stands next to it, we must add four from Chili.

In the Buprestidæ the genus *Stigmodera* is often quoted as a striking illustration of affinity of animal life between Chili and Australia. It is impossible to dispute the absolute identity of their type ; they do not, however, pass further to the north than Peru.

*Anthaxia* is another type whose distribution corroborates my hypothesis. It is all but absent from Africa, India, and Brazil, or only very sparingly, and not very characteristically, represented by one or two species at the Cape of Good Hope or in the Malayan region ; but in Chili it is so identical in appearance with our European species, that I remember when I first got some Chilian species I put them aside as obviously ticketed with an erroneous habitat. They also occur in Australia, although the species there are not so absolutely European in appearance.

A not less striking resemblance between Chilian and European species occurs in a heteromerous genus from Mendoza, at the eastern foot of the Andes (*Cacicus americanus*), which is so exactly a large counterpart of *Elenophorus collaris* from the Mediterranean, that I hold it to be perfectly certain that if both had been found in the same locality, only one genus would have been made for both. It is an out-of-the-way-looking genus, and no other example of the form occurs anywhere else on the face of the earth, so far as is yet known. The Scauridæ present similar South-of-Europe resemblances.

The Gallerucidæ, a family which is represented by different forms in the different regions where it occurs, are represented in the Europeo-Asiatic regions by the Halticidæ. These are very numerous also in Chili. The genus *Lithonoma*, of which only two species have hitherto been described (one from Spain), reappears in Chili, from whence I have received a species not yet described. In *Cryptocephalus* again, although the type leaves very

\* One is recorded as having come from the East Indies, without more precise indication ; but as that word generally includes the Himalayas, which are half Europeo-Asiatic, the locality cannot be counted either way.



little room for change in appearance, there is a certain difference between the Indo-African species and the microtypal. Brazil has only two or three of its own, and they have, to all appearance, been derived from North America or the west of the Andes. And there is again a difference between the European microtypal and the North-American microtypal, the latter having a facies of their own, which is shared by the Chilian and Peruvian species, and also in a less degree by the Australian.

In the Cassidæ we have the well-marked North-American genus *Porphyraspis* running down into Chili. In the Coccinellidæ, the *Hippodamias* (with the exception of one straggler in the Brazilian region, and one or two on its borders near Quito and Bogota) are entirely confined to the microtypal range, Chili being its southern limit, but it has not been met with in Australia. *Coccinella* proper, however, which has a similar range to *Hippodamia*, occurs there, and one or two stragglers have also found their way to the Cape, and one (*C. transversalis*) to the Malayan region.

The microtypal stirps in the southern extremity of South America is divided into two subfaunas by the Andes: that on their western flank is merely a continuation of the fauna of Western Peru; that on the eastern flank is cut abruptly off on its northern margin by the river Plata, where it meets the Brazilian type. The demonstrated history of this country sufficiently explains this distribution. Mr. Darwin in a few lines tells it thus: "The landscape has one character from the Strait of Magellan along the whole eastern coast of Patagonia to the Rio Colorado; and it appears that the same kind of country extends northerly in a sweeping line as far as San Luis, and perhaps even further. To the eastward of this line lies the basin of the comparatively damp and green plains of Buenos Ayres. The former country, including the sterile *traversia* of Mendoza and Patagonia, consists of a bed of shingle worn smooth and accumulated by the waves of a former sea; while the formation of the Pampas (plains covered by thistles, clover, and grass) is due to the estuary mud of the Plata deposited under a different condition of circumstances." (Darwin, Journal, p. 402.) In those days the water came quite up to the mountains on the western as well as the eastern side; for we learn from the same source that "the valleys in the Cordillera are filled with an immense thickness of stratified alluvium, which in all probability was accumulated at the bottoms of deep arms of the sea, which, running from the inland basin, pene-

trated to the axis of the Cordillera in a similar manner to what now happens in the southern part of the same great range."

There seems no reason to doubt that Patagonia and Chili were both supplied with their present faunas and floras from the main microtypal stock on the Andes. It is natural that from them the newly exposed sea-bottoms should have been peopled as they appeared, and quite in accordance with this that the stock flowing off to the right hand and the left should, while retaining a common character, have each respectively minor peculiarities. This is what we should expect, and this is what we find. In both we find the same forms of microtypal Carabidæ, *Cnemacanthus*, *Harpalus*, *Antarctia*, &c., the same modifications of Heteromera, as *Nyctelia*, *Cardiagenius*, *Praocis*, &c.; and in both the fauna, as a whole, is remarkably scanty.

In Patagonia, however, there occur one or two forms whose presence it is not easy to account for. The genus *Eucranium* occurs, not on the desert-plains between the mountains and the sea, but at Mendoza, at the foot of the eastern flank of the Andes, where the plains begin to rise into the desert base of the mountains; for notwithstanding the advantage of water from their snowy peaks, the coarser shingle at the base of the mountains maintains its sterility equally with that of the less-watered finer shingle at a greater distance from them. Now *Eucranium* is undoubtedly the representative of the Caffrarian genus *Pachysoma*, which is one of the Ateuchidæ, or pill-rolling beetles of Africa and India, the ancient *Scarabæus* of the Egyptians; and if this were a solitary case, I might perhaps have tried to get over it by arguing that although the *Scarabæus* is certainly an Indo-African form (being found both in India and Africa, and in preponderating numbers in Africa and all over Africa), it might yet have originally been microtypal because it is found in the Mediterranean district, not only in Egypt, Algeria, and Barbary, but also in Italy, Greece, &c., and from thence might have extended into Africa. But against this is the fact that *Ateuchus* is not found in Heer's lists of Miocene species, although *Gymnopleurus*, another pill-rolling beetle, whose distribution is similar to that of *Ateuchus*, is recorded there. The latter fact may be only an earlier instance of what has taken place in *Ateuchus*, or it may refer to some more ancient state of things; for all Coleoptera have no doubt been originally connected: but the connexion of *Ateuchus* with Europe is not the immediate point; it is the connexion between one of its

South-African peculiar forms and a closely allied form in Patagonia. Any doubt, however, that I might feel vanishes when I find other African forms or their representatives in Patagonia. In the Straits of Magellan has been found *Agrius fallaciosus*, a hunting carnivorous beetle, an undoubted relative of the South-African *Manticora*; and although cavils might be made against it on the score of the occurrence of one or two other allied forms in the continuation of the Andes in North America (*Amblycheila* and *Onus*), we have another stronger case still in the presence of the Rhea or South-American Ostrich. It could not be cast on the Patagonian shores by flotsam or jetsam, it could not fly over the intervening ocean; in fact, it is as strong a case implying actual continuity of soil as could be made up were one intentionally to try to contrive one. The concurrence of these three settles the point of their each being genuine instances of the presence of a South-African element only to be accounted for by continuity. The question then comes to be, Where and when did this continuity exist? As to the when, it seems clear that it must have been prior to the appearance of the Pampas and the plains of Patagonia above water. The specimens of *Eucranium* have all been obtained, not on the desert-plains or on their margin near the sea, but on the other inland side of these deserts at the base of the eastern side of the Andes, in the deserts of Cordova, in the neighbourhood of Mendoza. Both the African *Scarabæus* and its Patagonian representative are desert insects, and all Patagonia between the sea and the mountains is apparently sufficiently fitted for it; so that if it had arrived from Africa after the land had assumed its present configuration, it ought to have been found on the coast and on the plains rather than beyond them on the now dry shores of this ancient sea-bottom. I infer that it was there before the sea-bottom emerged, and has not yet spread far from the spot it occupied or escaped to on the occasion of that event. The reason why it has remained thus stationary, and not gone back as soon as it had the power, by the reappearance of dry land, into its former ground may be that its constitution had undergone a change when its conditions of life were altered. Perhaps until then it was a mere *Pachysoma*, as at the Cape of Good Hope, but under the new conditions changed into *Eucranium*; or it may be that in the struggle to obtain a footing on the reappearing land it was distanced by other species more speedy in their invasive movements or better suited to the locality.

I suppose I may assume that if the present position of *Eucranium* is due to a former union of Patagonia with Africa prior to its existence, the same conclusion applies to *Agrius* and the Rhea. We do not require a separate *Deus ex machinâ*, a separate junction of Africa and Patagonia for each of these desert species. Had any of them been of a constitution inconsistent with existence in a desert, we might have had to do so; but all three being by nature denizens of that kind of country, one explanation, one resource will do for all.

The next question in relation to them is in what direction the union of land lay by which the species travelled from Africa to South America, and by what route they reached their present locality. They may have come *viâ* the South Pole or Cape Horn, and having been established in a southern (now vanished) land, spread north to their present locality; or they have come in by Brazil and spread south to it; or their present habitat may be merely the inner margin of a wider former stretch of plains reaching all the way straight across the Atlantic. It may be that a former land once existed there where the plains of the Pampas now lie. The present Patagonia may not be the first of the kind, although the first of the name. This may be actually Patagonia the second, or, for aught we know, Patagonia the third. Mr. Darwin tells us of what must have been more than one previous Patagonia submerged and destroyed. "It required little geological practice," says he, "to interpret the marvellous story which this scene at once unfolded." (He is looking at some petrified trees on a bare slope of the Andes at an elevation of 7000 feet, near Mendoza.) "I saw the spot where a cluster of fine trees had once waved their branches on the shores of the Atlantic when that ocean (now driven back 700 miles) approached the base of the Andes. I saw that they had sprung from a volcanic soil which had been raised above the level of the sea, and that this dry land, with its upright trees, had subsequently been let down to the depths of the ocean. There it was covered by sedimentary matter, and this again by enormous streams of submarine lava, one such mass alone attaining the thickness of 1000 feet; and these deluges of melted stones and aqueous deposits had been five times spread out alternately. The ocean which received such masses must have been deep; but again the subterraneous forces exerted their power, and I now beheld the bed of that sea forming a chain of mountains more than 7000 feet in altitude." (Darwin, 'Journal,'



p. 406.) It was by that pristine Patagonia that these African relics must have reached their present place of abode, and it must have stretched out until it reached the Cape of Good Hope, sending out perhaps arms to Tristan d'Acunha and St. Helena, which, however, have the option of, what I think, a still more ancient union in another direction, as to which I shall have something to say when I come to Brazil and Madagascar. Judging from the character of the species preserved, we can guess at the character of the land uniting the two continents. It must have been a country much of the same general character as Caffraria, perhaps more flat and desert, and, like it, thinly clothed with vegetation. If it were not, then surely some trace of the African flora would have been left on the Andes. When it sunk again, all visible traces of its existence sunk with it, except perhaps the Rhea and beetles (and possibly one or two other animals which have escaped my recollection or, as yet, the researches of travellers) which happened to be left on the shore when the ground in front of them disappeared, the score or so of plants left on St. Helena and Tristan d'Acunha, and a slight sprinkling of microtypal forms which still subsist at the Cape. That there should be such a trace at the Cape is, I think, essential to the hypothesis, always provided that the microtypal stirps had then reached the Patagonian Andes; for although from the physical nature of the country at the Andes a whole continent might sink out of sight quite up to its walls, carrying its population with it and leaving almost no trace behind, there is no similar barrier at the Cape. Some of the population of the submerged land must have either already settled in the country or escaped from their own land when it sunk. It may be that the microtypal stream had not yet reached Patagonia, that it arrived there, *via* the Atlantic islands, subsequent to this event. Mr. Darwin mentions that Mr. Brown determined for him the petrified trees above mentioned to be Araucarias; but this does not settle the question, for although coniferous trees are certainly microtypal, the Araucarias may have come from Brazil of an older date. I shall, under the head of Polynesia, notice the arguments, *pro* and *con*, as regards the character of the *Araucaria*. That Caffraria has a slight tinge of the microtypal element is certain; but it may have received it from Australia, as an affinity indicative of an ancient connexion between the Cape and the south-west of Australia has been sufficiently proved in plants, mammals, birds, as well as in insects. In

favour of this Australian connexion having been the source of the microtypal Coleopterous element in Caffraria, it may be said that it seems to be most pronounced on the eastern coast of South Africa; against it that the element, if filtered through Australia, should have been more modified from the original northern type than it seems to be.

So far as regards the submerged Patagonian continent in question, I think we may, from the paucity of the traces left of its inhabitants, come to the conclusion that its duration, as compared with that of other continents, had not been long. It must have taken a long time for insects slowly to have spread from Africa to South America; but it seems to me that where there are no exceptional causes of fertility (as where a limestone or chalk seabottom was upraised, which I imagine, from being composed partly of organic matter, would be more speedily fertilized), where, for example, the bottom was sandy or shingly, as in Patagonia, or sandy, as in the Sahara, and where there is no water running through it, the process and rate of rapidity of clothing it with soil and vegetation must, *cæteris paribus*, be nearly the same in all, and that we may form an estimate of the comparative age of a country by the degree of fertility of its deserts. Thus I should suppose the Kalahari desert, which, although called a desert, is not wholly a waste, but studded with tufts of plants, must be older than the Salt-Lake deserts in North-west America, which are only beginning to get a widely scattered dotting of sage plants, and these deserts again to be older than the Sahara, which has no vegetation at all upon it. It is true that the conditions of the Sahara are exceptionally unfavourable; but I take it there is some truth under the idea. So judged, the Patagonian continent could not have been proportionately far advanced, judging from its inhabitants, when it again sunk out of view.

Polynesia has hitherto been an entomological puzzle; and one of our most eminent British entomologists lately told me that after poring over the lists of its species and making them up into tables on various principles, he had at last been driven to the conclusion that they were composed of the sweepings of the whole world, and that there was no other way of accounting for them but by the supposition that the Pacific islands have had a dip under the sea long enough to kill all life, and that what was now found on it was derived from subsequent colonization after their reappearance, drawn, like its sailors, from all quarters of the globe.

Under my theory the Pacific Islands lead to no such inference. We must bear in mind that we have two distinct kinds of islands to deal with in the Pacific—the coral islands, like Keeling Island, the mountain-islands, like Tahiti. The coral islands are in the case described by my friend; the mountain-islands are not. What Darwin says of Keeling Island is no doubt true of all the coral islands:—"As these islands consist entirely of coral, and at one time probably existed as a mere water-washed reef, all the productions now living here must have been transported by the waves of the sea. In accordance with this, the flora has quite the character of a refuge for the destitute; Professor Henslow informs me that of the twenty species, nineteen belong to different genera, and these again to no less than sixteen orders"; and these nearly all "common littoral species in the East-India archipelago"\*. The animals on that island were a rat, one or two wading or sea-birds (obviously stragglers), a small lizard, some spiders, and thirteen species of insects of different orders,—viz. of beetles, one minute Elater (the reader will remember that of the three beetles introduced in the Azores from Brazil, two were Elaters, the mode of their larval life in timber and the hard wire-like skin of these larvæ, as unsusceptible to wet as a duck's back, seeming favourable to their chances of successful transit); of Orthoptera, a *Gryllus* and a *Blatta*; Hemiptera, one; Homoptera, two; of Neuroptera, a *Chrysopa*; of Hymenoptera, two ants; of Lepidoptera, a *Diopæa* and a *Pterophorus*; of Diptera, two; and of these, without attaching much importance to it (as I admit that they are the product of chance introduction), I may still observe that, with the exception of *Blatta* (doubtless a naval *cadeau*), the whole, so far as named, are microtypal genera, a circumstance which ceases to be surprising if I am right in considering the non-coral isles of Polynesia as microtypal. I abandon the coral isles as "no man's land," but I claim as microtypal the islands which are composed of more solid stuff, especially those lying between Australia and America, and which are furthest from the influence of the New Guinea and Malayan subfaunas. It is from Tahiti and the Marquesas that the species of Coleoptera which we know from the eastern part of Polynesia have chiefly been obtained, from the New Hebrides and New Caledonia that we have received those from its western half. I shall take the eastern part first. Its microtypal character is thus well, although unconsciously, depicted by Fair-

\* Darwin's 'Journal,' pp. 541-543.

maire in his "Monograph on the Coleoptera of Polynesia" (Rev. Zool. 1849-50):—"In general, the Coleoptera of Polynesia have a facies by no means equatorial: although living under a burning sky, in the midst of a luxuriant and always growing vegetation, their colours are sad, and their bodies do not exhibit the large size, the varied form, the metallic lustre which we admire in the Coleoptera of New Guinea and the East Indies. A Buprestid of tolerable size, *Chrysodema Tayauti*, almost alone represents that tribe so numerous in New Holland and New Guinea; the Chrysomelidæ are reduced to two or three insignificant species" (Rev. Zool. 1849, p. 279).

So much for the facies. The actual relationship of the materials composing it is shown in a Table in the Appendix, which I have made up from M. Fairmaire's work above cited, and in which I have marked the distribution of the different genera composing it.

From these it will be seen that not only a very large preponderance are of microtypal form, but that the fauna contains many genera which are familiar to the British entomologist as especially characteristic of the British subfauna, such as the genera *Anchomenus*, *Bembidium*, *Colymbetes*, *Agabus*, *Bolitochara*, *Placusa*, *Sunius*, *Leichenium*, *Anthicus*, *Ditoma*, *Cicones*, *Cerylon*, *Rhizophagus*, &c. The forms which have been borrowed from non-microtypal regions are not numerous; and there is no difficulty in indicating their source, the species being in many cases identical with that of the country from which it has come, a very common thing with introduced species, and which does not occur here with the microtypal species. In them the genus is the same, but the species is changed into new ones. It is this difference between recent immigrants and long-descended natives which generally renders lists of the distribution of mere *species* of so little value. They tell the tale of close vicinity, which we usually know without them, and of chance introductions, which throw no light on geographical phenomena; whereas lists of the distribution of *genera* speak of forms originally the same, but broken into new species by subsequent separation; and by their affinities we can trace their history much further into the past. In this concatenation the multiplication of genera on slight grounds is a serious obstacle to the study of geographical distribution. It injures it not merely by overburdening the memory with unnecessary names, but mainly by depriving



us of reliable data for estimating the affinity of the inhabitants of different regions which we should otherwise have had.

I give a list of the known species contributed from other countries in the Appendix, from which it will be seen that they are derived as follows, viz. from

North America.....	2 timber species (common).
Brazil.....	3 timber species (common).
East Indies and Philippine Islands	{ 4 timber species (2 microtypal and 1 carabid).
New Holland.....	{ 2 timber species, 2 Heteromera, both microtypal, and 1 Staphylinid, microtypal.
New Zealand.....	{ 1 timber species and 1 Staphylinid, microtypal.

And 1 cosmopolitan wanderer of doubtful origin.

Besides these, however, there are a number of types from these countries which have probably been introduced by nature without the help of man; for they are modifications of peculiar forms, and not actually the same; and whatever may be the alterations which change of climate has made within the reach of man's observations on species of the higher animals introduced by him, there is not the slightest ground for supposing that any change has been ever so produced in insects. It was, of course, only to be expected that there should be something of this sort from the East Indies. It is natural that there should be some overflow or some dispersal into a country so near; and in conformity with this we find the proportion of its overflowings diminishing as we recede from India. It is for this reason that I have in my Table above mentioned limited the list to Fairmaire's species from Central and Eastern Polynesia. Even that is divisible into two sections. Of the Eastern, M. Fairmaire says:—

“At Tahiti, where the temperature is very various, owing to the lofty mountains, where numerous streams preserve freshness, the species are more varied, the individuals in greater abundance, *Carabici* and *Brachelytra* are met with. The Sandwich Islands, which are situated to the north of the Equator, at the same distance as Tahiti is to the south, give almost the same insects in very small quantity.”—*Rev. Zool.* 1849, 279.

Of the middle portion, again, he says, “At Tongatabou, a flat

sandy soil, where water is rare at the surface, the *Carabici* and *Staphylinidæ* disappear, and in recompense the *Heteromera* appear in greater numbers, and some of the genera indicate, like the vegetation, an approach to Melanesia and Asia. It is the same as regards the Wallis Isles, the productions of which are almost identical with those of Tonga. In that western part we begin to find metallic colours, and generic types unknown to the eastern part, as *Amarygmus*, *Olisthæna*, *Mallodon*, &c.; but there remain still too many points of contact between these two zones to allow us to separate them distinctly."—*Loc. cit.*

The western islands have still more of this Indian element, as will be seen from the Table, which contains a list of the genera found by Father Montrouzier in New Caledonia. As my purpose is only to indicate the general character of the fauna of that part, I have not dissected it so minutely, but merely indicated the results. It will be seen from these that the microtypal stirps continues the staple, although a greater number of introductions from the Indian region and the Australian sub-fauna are visible. The most noteworthy of other alliances are those from South America; and perhaps the most interesting is the presence of a Firefly (*Photophorus*) in the islands (the New Hebrides) most distant from the South-American proper abode of the Firefly. The Glow-worm is a Miocene insect, and belongs to the microtypal stirps. The Firefly is neither. It is confined to the range of the Brazilian stirps. There ought to have been no Fireflies in my microtypal Pacific continent unless supplied from South America. There are other cases of a somewhat similar nature, in other branches, which will occur to the naturalist—for instance, the *Araucaria*, which, besides occurring in Brazil and Chili, is also found in the Pacific islands. This, indeed, is not so special a case; for Conifers being of old date in Europe, and in their associations and present distribution decidedly microtypal, the *Araucaria* in Chili and the Pacific islands may be modified descendants of the ancient European types, and the Brazilian species a straggler from them. The occurrence of the Tapir both in South America and the Malayan Archipelago points to a connexion between them at a comparatively recent date.

The other classes of insects, so far as I have gone into them, seem to me to corroborate the microtypal character of the Coleopterous fauna. As to the flora and avifauna I must, for the present, put them aside with those of Australia, with which they have considerable affinity and some identity.

New Holland is my next stage; and here I would first observe that the Coleopterous fauna of Australia, although recent discoveries show some modification and even a slight infusion of Malayan blood in the north, is as a whole homogeneous. In the next place, I do not anticipate any opposition to the general proposition that many of its ingredients, especially those in the south, have a European aspect. There are other elements which may very fairly form the subject of discussion whether they are derived from a microtypal origin or not; but as to the European affinity of a very considerable portion there can, I think, be no doubt. It will be sufficient to remind the entomologist of the genus *Pamborus*, the *Lebiidæ*, the *Broscidæ*, the *Feroniadæ*, *Haliphus*, the *Hydroporidæ*, the *Colymbetidæ*, *Gyrinus*, *Hydrophilus*, *Berosus*, *Arcticerus*, *Silpha*, *Nitidula*, *Soronia*, *Meligethes*, *Thalycra*, *Peltis*, *Hister*, *Morychus*, *Cucujus*, *Dendrophagus*, *Syn-calypta*, *Ptinus*, *Trichius*, *Onthophagus*, *Aphodius*, *Lacon*, *Chalcophora*, *Lycus*, *Tenebrio*, *Anthicus* (of which there are 48 species already described from Australia), *Curculionidæ* allied to *Trachypylæus*, *Lepyrus*, *Eurhinus*, *Otiorhynchus*, *Cryptorhynchus*, *Longicornus* (which, without being *Leptura* or *Rhagium*, are so like them that the names *Lepturoides* and *Rhagiomorpha* have been given them), *Haltica*, *Longitarsus*, *Hispa*, of the European type, *Coccinella*, &c., genera by far the greater number of which have no representative out of microtypal lands.

Even those forms which are usually considered typical of and peculiar to Australia, when carefully considered, lead to the same result. The *Anoplognathi*, one of the largest, showiest, and most brilliant metallic species in the country, belongs to a special group of Lamellicorns, which is well represented in Chili by allied forms (*Platycelia*, *Brachysternus*, &c.); but it is still more closely copied in North America in what is there called the Goldsmith Beetle, *Cotalpa lanuginosa*; and if we pass on to Europe we do not, indeed, find it now, but we find fossil remains of it in the Miocene beds. The genus *Lamprima* is, at first sight, as peculiar as *Anoplognathus*, and equally restricted to Australia. It is little more than a metallic *Streptocerus*, a Chilian form, allied to *Scortizus*, which is not a very great deviation from the European and North-American *Platycerus*. I have a species (undescribed I believe) which has exactly the facies of an *Akis*, although systematists may insist on carrying it to *Adelium* or *Thoracophorus*. The Dish Beetle of the Australians (*Helæus*) looks as if nothing could come near it.

Examined, what is it but a modified *Cossyphus*? At the first glance, one would seek to place *Chrysolopus spectabilis* among the Diamond Beetles; at the second, among the *Aterpidæ*; but Lacordaire rightly tells us that both in character and habits it is only a magnified and abnormally decorated *Hylobius*. Another very characteristic Australian form is the genus *Paropsis*. But although almost confined to Australia, there are two exceptions, *Paropsis* 12-pustulata, Gebl., and *P. hieroglyphica*, Fab., both from Dauria, one of our microtypical countries, and one which, on any other other principle but that of my hypothesis, it seems difficult to connect with Australia. *Stigmodera* puzzles me as to its first origin more than any of the other peculiar institutions of Australia. It occurs in almost equal abundance and in still greater beauty in Chili, even showing itself by one or two stragglers in Brazil; and both its form and coloration are so close to those of our European and American *Ancylocheira*, which were already common in the Miocene epoch, that it is difficult to doubt that the one is a modification of the other; but then we have *Ancylocheira* proper also in Australia, the elongated form of *Ancylocheira*, which is found in California; and although that helps the microtypal list in one way, it rather militates against *Stigmodera* being descended directly from *Ancylocheira*. There is, indeed, nothing to hinder the species from having retained its type in part of the land and changed it another. On the other hand, however, *Stigmodera* can hardly be separated from *Temognatha*, certainly not in a derivative point of view; and *Temognatha* cannot be separated from *Julidimorpha*, and it is so like the African *Julodis* or *Sternocera* that it is difficult to believe that it does not contain some African black blood, communicated at the time when there was some connexion between the Cape of Good Hope and the south-west corner of Australia—a connexion which is recognized by all botanists, and whose traces are also discernible in all the other classes of organic beings, and which, as already said, may have been one of the means by which the Cape obtained the sprinkling of microtypal forms which is to be met with there. The Longicorn genus *Hesthesis* is now confined to Australia; but it is one of the European Miocene genera recorded by Heer. The genus *Chrysomela* is distinctly microtypal in its distribution, being, with a few easily understood exceptions, absent from India, Africa, and Brazil. One very distinct form of *Chrysomela* is the elongated



forms which are so common in Switzerland (*Oreina* and *Entomoscelis*). In Australia these are represented by *Australica*, which repeats their markings. The genus *Galleruca* presents similar resemblances; I have a species from Port Phillip scarcely distinguishable from our British *Galleruca Nymphaeæ*. Of *Hispa* I only know two in New Holland; but one of these is very closely allied to the black species of Europe (*H. atra*, Fab.).

But it is not only in what it possesses that Australia shows its microtypal origin, but also in what it wants. In it we have no large Dynastidæ or large Lucanidæ, no Brenthidæ (notwithstanding the close vicinity of the New-Guinea and Malayan Archipelago, where they are so abundant) except a few species in the extreme north of Australia, obviously derived from the Malayan islands, no Sternocera, no Steraspis, no Psilopteridæ. In these and a multitude of similar *lacunæ*, the Australian fauna corresponds with that of the microtypal stirps in other countries.

The relative predominance of types is another, though a slighter, indication of relationship. If, for example, we take the whole order of Longicorns, we shall find a remarkable parallelism in the number of species in Europe and Australia. Professor Lacordaire, in the 8th volume of his 'Genera des Coleoptères,' has the following remark upon them. "The equality," says he, "which exists in respect to numbers of species of Longicorns, between Australia, Europe, and North America, is remarkable. The first, according to Mr. Pascoe's Catalogue, published two or three years since, had then 407 described species. Europe, according to Schaum's Catalogue, had 412; and Melsheimer's 'Catalogue of North American Species,' as published by Leconte, had 408."

That a certain amount of infusion of New-Guinea and Malayan species should be found on the northern coasts of Australia was to be expected; but it is less, much less, than might have been anticipated, seeing that, from the shallowness of the Straits separating them, former union at some time or other might be predicated. I have already said that there is in some classes of animals and plants an affinity between the Cape of Good Hope and Australia. In the Coleoptera it is not very strong, but perfectly recognizable. For example, I think the characters, facies, and tuberculous covering of the Australian genera *Amycterus*, *Psolidura*, *Acantholophus*, and *Leptops* indicate affinity with the African *Somatodes* and *Hipporhinus*, of which latter, indeed, there are actually two species in Australia (as against seventy-six in

Africa); and the type seems to run on into Chili; for if *Leptops* is related to *Hipporhinus*, so is *Megalometis* (a Chilian genus) related, to *Leptops*.

A very remarkable African affinity in the Lepidoptera has been mentioned to me by Dr. Welwitsch. It is plain that an affinity to any genus endowed with peculiar properties is rendered doubly certain if the supposed allied species possesses the same properties. There is a Lepidopterous insect in Australia, the larva of which possesses remarkable poisonous powers. It has been named *Doratophora vulnerans*. Such insects also occur in South Africa. Livingstone speaks of a caterpillar called *Rigura* as producing fearful agony if a sore is touched with its entrails. Mr. Baynes, in his 'Explorations in South-west Africa,' speaks of another, or perhaps the same, which he calls the *Kaa*, and which is used as a poison for their arrows by the Bushmen; and Dr. Welwitsch had a personal experience of the severe swelling and pain in every part of his body which he touched with his hand after collecting specimens of a caterpillar against which he had been warned as poisonous. He had in consequence of the warning carefully avoided touching them, shoving them into a phial with a straw; but whether he had inadvertently touched them, or fingered the leaves on which they had been feeding (which he collected for examination), he and his servant were both laid up helpless for two or three days. His specimens of the caterpillar were lost; but among his Lepidoptera Dr. Fendler, of Vienna, who has undertaken a description of them, finds no less than four species of *Doratophora*; and these, doubtless, are the perfect insects of species of the caterpillar from one of which he suffered.

But although African affinities occur among the Lepidoptera, as among other classes, their character, as a body, is microtypal. I am not sufficiently a Lepidopterist to speak with any personal authority on the subject so far as regards minute distinctions; but I am sufficient of an entomologist to say that in the nocturnal Lepidoptera, especially those from Tasmania and South Australia, the facies is absolutely identical with those of this country, and many of the genera the same. Over the most of Australia diurnal Lepidoptera are extremely scarce; but the facies in them, too, is of the same character.

At the outset I admitted the wide difference between the present flora of Australia and our own microtypal flora; but I must not

make the admission too unqualified; I must not lose sight of the beeches, the Frenelas, the Phyllocladi, which are of a different stirps from that of the rest of the flora of New Holland, a microtypal class of plants, too, that obviously connect New Holland with the microtypal lands of Chili and New Zealand.

The mammals and the birds of New Holland must, like the flora, be kept apart, and put in another category from the insects. How far this separation has to be carried in other classes, I shall not examine at present.

The Coleopterous fauna of New Zealand, although it has a somewhat different facies from that of New Holland, cannot be really separated from it. There are too many points of concurrence which can be accounted for only by a common origin to allow us to do so. The facies, although not quite the same, is in the same line, sombre, sad-coloured, small, or moderate-sized species. One very marked and distinct family of Carabidæ (the Cnemacanthidæ of Lacordaire, Broscidæ of Putzeys) seems conclusive as to the former connexion of Australia, New Zealand, Chili, and Patagonia—that of Chili and Patagonia more distant, and that of New Holland and New Zealand more intimate, and both characterized by a distinct section, which Castelnau has erected into a genus, named *Mecodema*. Putzeys, who has lately published a monograph of the whole family, looking only at the countries in which it is located, says truly enough, “the Broscidæ are represented in most regions of the globe;” but it is only another instance of microtypal being mistaken for cosmopolitan. Taking the continents of our modern maps as real regions, the family is represented most widely; but disentangling the localities and referring them to stirps, not a single species will be met with in the Indo-Malayan, the African, or Brazilian fauna, but the localities will be found to lie all in microtypal regions, and to be pretty generally and equally distributed over them all.

It may be instructive if I run over the genera of which the family is composed. Taking Putzeys’s Monograph we have—

*Broscus*. Europæo-Asiatic.

*Craspedonotus*. Japan.

*Mecodema*. New Zealand.

*Metaglymma*. New Zealand.

*Percosoma*. Tasmania and Victoria.

*Lychnus*. Tasmania.

*Oregus*. New Zealand.

*Promecoderus*. New Holland.

*Anheterus*. Adelaide.

*Adolela*. Swan River.

*Parroa*. Swan River.

*Cascelius*. South Chili.

*Broscosoma*. Europe.

*Miscodera*. Europe and North America.

*Baripus*. Montevideo, Port Famine, Chili.

*Cnemalobus* (*Cnemacanthus*). Chili and Patagonia, one species extending into Bolivia.

*Gnathoxys*. Australia.

The family is apterous, so that no theory of dispersal by powers of flight will apply.

The *Hydropori* and *Colymbetidæ* of New Zealand are exceedingly similar to our species—one species so much so, that it has been supposed to be introduced. *Staphylinus oculatus* is close to the Australian *Staphylinus erythrocephalus*, which is also found there; and it may be noted incidentally that there is a greater resemblance between the latter and *St. variegatus*, from Montevideo, than to any Chilian species. This may be a key to some date or order of events; but one such key is not enough to unlock the close-bound history of these former epochs. One or two very European-like Longicorns occur; and even those which seem most puzzling, if studied in relation to our own species, will, I think, be found to belong to the same type; for instance, *Hexatrichia pulverulenta*, Westw., is only an enlarged *Pogonocherus*, as is *Opsis nutator*, from Polynesia; and *Pogonocherus* is surely microtypal. That some of the Longicorns have a relationship to those of New Guinea and the Indian Archipelago (*Tmesisternus*) is only what we might expect. I have had my attention drawn to a species which is described in the zoology of the 'Novara' voyage as inconsistent with my hypothesis—a species of *Acanthoderus*, a genus the metropolis of which is now Brazil. But, curiously enough, notwithstanding this, the genus *Acanthoderus* occurs in the Miocene beds of Europe, and three species still survive in the northern regions, two in Europe and one in North America. How the genus comes to be so strongly represented in the Brazilian fauna is another question. It may be a type of universal



distribution, or it may be there as a representative of the microtypal element.

I now pass on to the Indo-African stirps. I may take it for granted that the East Indies south of the Himalayas, Siam, the south of China, and the Malayan Archipelago, all belong to one fauna or subfauna. It is not even possible to make subsections of any portion of them; not only the genera but even the species are often the same on both sides of the Bay of Bengal.

The only point on which I anticipate any difference of opinion in this direction is the relation of the New-Guinea group of islands to the Malayan group. As every one knows, Mr. Wallace has in various publications advocated a separation of the New-Guinea group from the Malayan by a line drawn up the Straits of Macassar, and has given a variety of interesting details in support of his views. Convinced by his reasoning, I adopted and followed his conclusions in my book on the 'Geographical Distribution of Mammals.' That was all right. The facts, so far as regards the Mammals, entirely supported Mr. Wallace's views, and I could do nothing else but adopt his hypothesis. I went rather further, however; I accepted his theory as of general application; and whether I have actually committed myself to that in so many words or not, I know I meant that, and I have no doubt that impression is given by what I say. I wish I had been a little more reticent; I now find, on a careful application of his hypothesis to Coleoptera, that it will not answer for them. Whether it be that we are dealing with creatures representing a more ancient state of things (the birds and mammals speaking to an arrangement of land and water at a comparatively recent period), or that we have overestimated the value of the differences of the fauna on each side of the Straits of Macassar, I do not know; but I do say, with a degree of positiveness and decision which, at any rate, must secure confidence in the strength of my own conviction, that the Coleoptera of the New-Guinea Islands are essentially Indo-Malayan. When I wrote my monograph of Nitidulidæ, I studied, as was my duty, the species collected by Mr. Wallace most thoroughly, and there was not a vestige of any element but the Indian element among them. So with the great mass of the rest. My friend Mr. Pascoe, who is our first authority on Longicorns, shares my opinion as regards them. There are undoubtedly a number of peculiar forms among the New-Guinea Coleoptera; but a few unusual

forms in the face of thousands of allied forms would be a poor foundation on which to rest a distinct fauna. As a subfauna distinguished by the numbers of Anthribidæ, new forms of Brenthidæ, beautiful Tesosterni, &c., it may pass; but even then the line cannot be drawn, as in mammals and birds, with any sharpness. Australia, as it has been affected slightly by the vicinity of this Indian fauna, also has contributed a little of its own specialities to the nearest islands.

Mr. Frederick Smith's Table of the geographical distribution of the species of Hymenoptera collected in this archipelago by Mr. Wallace shows the same thing (Linn. Soc. Proc. vii. p. 109, 1864); and a still more striking result to the same effect would be exhibited if the genera were contrasted in the same way as he has dealt with the species.

The Philippine islands belong to the same group, although, like Formosa (which is on the boundary), they are probably not without a microtypal tinge. The *Pachyrhynchi* may fairly be considered to be representatives of the strictly microtypal genus *Otiorrhynchus*.

Africa (south of the Sahara, of course) is better entitled to claim rank as a separate province than India. The general facies is different, the character and tone of the scenery is more decided—no doubt, owing to the difference in the conditions of each country, which has given greater predominance to one part of the same fauna in the one, and to another part in another. In Africa the great sandy deserts have encouraged the development of *Adesmia* and such desert-loving Heteromera, while in India there has been not only apparently a greater admixture of foreign elements, but in much of it, especially in the moist forest-overgrown island-mountains, there is no scope or suitable conditions for such species, but the other members of the fauna which flourish in wooded lands take their place.

One strong argument in favour of the original unity of the stock of India and Africa is that most of the genera which occur in the one country are to be found in the other when suitable conditions present themselves. It must always be kept in mind that while the presence of uncongenial conditions is a perfectly good explanation of the absence of any forms we might expect to meet, we have no right to expect something else to be there unless that something is a member, an ally, or a modification of something already in the fauna. Thus the absence of sandy deserts will account

for the absence of *Adesmias*, but will not account for the presence of Brenthidæ, unless the Brenthid element were previously in the fauna; and so where, in a different country having special conditions, wholly new things are met with, the inference is that we have come into a new geographical region. Applying this to India and Africa, we can trace the concurrent existence somewhere or other of so many of the same genera in each, although certain elements preponderate in the one more than in the other, that it seems to me impossible to doubt that their origin is the same—that is to say, that before they were separated from each other the general type from which they have sprung was the same in both.

In my book 'On the Geographical Distribution of Mammals' I contrasted the genera which were present in Africa with those which were present in India; and the one list was almost a copy of the other. I did the same with the genera which were not found in Africa and those which were absent from India; and here again the lists were almost identical. Similar lists of the genera of Coleoptera present in, or absent from, the two countries give similar results. There is not space to make such an enumeration here; but I may remind the Entomologist of such characteristic genera common to both, and confined to both, as *Anthia*, *Ateuchus*, *Helicopris*, *Goliathus*, *Heterorhina*, *Glycyphana*, *Popilia*, *Platynotus*, *Notocorax*, *Ceroplesis*, *Sagra*, &c. In many instances, too, where the genus is not confined to India and Africa, I think we may discern something in common between those species which come from these two regions. Thus in *Cicindela*, for example, a very common bond of union is the possession of white sutural lines or patches. In *Chlænius* the species with a narrow constricted thorax are mainly confined to these regions. The Platycorynus form of *Eumolpus* occurs in them, and in them only; so does the flat palmate expanded form of *Hispa*; and many more will occur to any one who searches for them.

The forms which are absent are scarcely less instructive than those which are present. There are, no doubt, many present in the one and absent from the other, whose presence or absence must be referred to dying out or first appearance after the separation of the two lands; but there are others which have a different significance. For instance, all the Staphylinidæ are very scarce in Africa. Through the kindness of my missionary friends I have received thousands upon thousands of Coleoptera from Old Cala-

bar. For several years, while Mr. W. C. Thomson and the late Mr. Wylie were stationed there, I was in the habit of receiving large collections every year from that place; and yet during all that time and out of all that multitude I never saw a Staphylinidous insect among them. In other parts of the continent, where, as at the Cape, they have been exposed to microtypal contact they do occur, but in trifling numbers. Boheman mentions thirty-eight in his 'Insecta Caffrariæ.' Natal and Mozambique supply a very few more; and Dr. Welwitsch found a few of the same genera in Angola. Now India is as poorly supplied with them as Africa; and the chief part of those found in both belong to such genera as *Pæderus*, *Osorius*, &c., which may possibly not be microtypal. But there are true microtypal species, both of Staphylinidæ and other groups, which are not found in India and yet occur in Africa, and which, I think, must therefore have been introduced subsequently to the separation of India and Africa, as, for example, *Aleochara*, *Cymindis*, *Anchomenus*, *Feronia*, *Bembidium* (see Boheman's 'Insecta Caffrariæ'), and various others, some of which will be found in the Table of the present distribution of Miocene genera given in the Appendix. There are three ways in which these may have made their entrance into Africa—(1) by Nubia and Abyssinia, (2) by the connexion with South-west Australia to which I have alluded, or (3) by the union with Patagonia, which I think can scarcely be disputed. One or two noteworthy peculiarities attend all these elements of mixture; viz. the comparatively small numbers of species which have succeeded in establishing themselves in the country or which have become generally distributed; the small progress which has been made by them in penetrating into it and getting away from their starting-point; and the absence of amalgamation with the original fauna on which they have been superinduced (which last is a strong argument against hybridization having any important part in the creation of new species). To these we must add, as obviously belonging to the same category, the remarkable disinclination or difficulty which one established fauna shows or finds to passing beyond its own limits into the territory of a neighbouring fauna, although the barrier which formerly separated them (and was the cause of them each having a distinct character) is now no more than an imaginary line. In Africa we can perfectly put our hands on the Abyssinian interlopers dropping in from the north-east, some, like plants and insects on Alpine mountains elsewhere,



having got into positions where their retreat has been cut off by a change in the physical conditions of the country\*. In like manner we can point out the Australian intruders at the Cape, the Cape element in Patagonia and without difficulty detect certain Brazilian settlers, which I shall presently mention as having made their way into West Africa. This, at first sight, seems difficult of apprehension and inconsistent with the wide spread of the very same species in other countries. Here are a few Staphylinidæ lingering at the Cape or at Angola without having succeeded in penetrating into West Africa, although, so far as we can judge, they have been there for many geological epochs; while other or the same genera of Staphylinidæ have in the short period since the retreat of the glacial epoch covered the north of Europe, Asia, and America with their hordes. There is something more here than mere physical barriers standing in the way of their dispersal. The explanation is simple: when the land fitted for their occupation is left free and unoccupied, as the northern half of Europe, Asia, and America was after the glacial epoch, the new comers cover the ground like wildfire, and the fauna and flora is rapidly established. When the ground is once occupied the case is different; every new comer meets the most stubborn resistance, the battle for life is resolutely contested, and the small proportion that we find established shows that few make good their entrance at all, and still fewer make any progress in their new land: and the truth may be that, instead of looking upon a scanty infiltration of an alien element into a land as an indication of its having been very ancient and almost washed away by repeated dilution (as we have generally been disposed to do), we should regard it only as an indication of a more recent attack on a well-garrisoned land which has successfully repelled the intruders. This is a consideration which throws additional light upon the enormous power and importance of the counterpoises of nature,—without them a land instantly taken up, with them the established order of things impenetrable to all assaults—not an encouraging reflection to revolutionists, if the same rule prevails in the moral world which exists in the material world, which we cannot doubt to be the case. The students of geographical distribution may likewise

\* The Berlin Museum has obtained from Mr. Van der Decken's expedition, a true *Carabus* from Mount Kilimandjaro. It is the only *Carabus* that has yet been found in Africa proper, is peculiar in form (elytra swollen and rounded), but in other respects more in the direction of *C. alpinus* of Switzerland than any thing else. It is obviously a European form whose retreat has been cut off.

draw useful reflections from it, both general and particular. An important general reflection is that, whenever we see a homogeneous fauna (I am speaking of faunas, but the observation applies equally, or nearly so, to floras), we may rest assured that that is the first fauna which established itself after the land emerged from the sea and became capable of sustaining animal life, and that we must look upon all patches, encroachments, or overlayings of a different character, as attempts of some subsequent intruders to establish themselves among the older inhabitants. We see, too, how there is no inconsistency in a colony marching rapidly across a raised sea-bottom, while it is arrested the moment it reaches the other side. Coming to particulars, this may prove useful in sometimes helping us to a date. Thus we may argue from the faunas of India and Africa that these countries were once continuous and united, and that they were disjoined before the Cape received its contribution from Australia; for there are types common to Africa and Australia which do not occur in India.

The relation between the Coleoptera of Brazil and West Africa furnishes so very apt an illustration of the value of such indications, and the use that may be made of them in tracing the past history of geographical changes, that I may be excused anticipating a little what I have to say on the subject of these faunas.

A few years ago I read a paper to this Society, in which I pointed out the existence of the Brazilian element in Old Calabar. I believe that paper was closely scrutinized at the time (in fact, I know it was) by some of our best entomologists, who looked askance at it at first, but ended by admitting that I was right. Since then I have gone on, from time to time, describing the new species from Old Calabar in the 'Annals of Natural History;' and I do not believe there has been one of my papers in which I have not had to record the Brazilian element as again and again appearing. The same thing is observed at Senegal and Guinea, and Gaboon; and it has also now been recognized in the Lepidoptera also.

The evidence thus given of the presence of an important infusion of Brazilian type in the West-African fauna seemed to me sufficient to place the fact beyond dispute; and I would not now have troubled the reader with any further proof of it, had it not been for an expression of opinion which has fallen from our much-respected President between the reading of this paper and the

printing of it, which shows me that I must not take this for granted ; and the delay in printing this paper fortunately gives me the opportunity of supplying the want. Mr. Bentham, in his Annual Address, 24 May 1869, p. xciv, says :—

“ Mr. Andrew Murray, in a paper on the Geographical Distribution of the Coleoptera of Old Calabar, in the twenty-third volume of our Transactions, as well as in his Monograph of Nitidulariæ, in the twenty-fourth volume, calls attention to a remarkable representation of Tropical-American types in Tropical Africa. I have myself on several occasions indicated a similar curious connexion in various vegetable types ; and if we were to rely on these grounds alone, we might, with Mr. Murray, speculate on a former continuity between the two continents across the Atlantic. But, independently of geological arguments, such conclusions are much invalidated by facts since brought to notice, as, for instance, that some of these common types are also represented in Australia or other distant lands south of the Equator. The general features also of the vegetation of the two continents tend to the conclusion, more or less confirmed, I believe, in various zoological departments, that, from a very early period in the history of organic life, the broad Atlantic, from the southern tropic to far into the north temperate region, has been an impassable gulf for terrestrial organisms, except by such occasional waifs and strays as may result from actual means of dispersion.”

Although neither by nature nor training at all disposed *jurare in verba magistri*, I candidly acknowledge that such an expression of opinion coming from one to whose judgment I, in common with all other naturalists, pay so much deference, satisfies me, not that I am wrong, but that my proofs are insufficient. I bow to his decision, lay fresh proofs before him and the reader, and ask a fresh judgment. In the Appendix I give a list of the genera of Coleoptera of Old Calabar with Brazilian affinities, so far as I have yet published them. I am not yet half through ; but what is published may be taken as a type of what is to follow. I might have swelled my list by including *species* of universally distributed genera which were allied to Brazilian species of the same genera ; but I have omitted them and taken only genera peculiar to the Brazilian stirps. The genera in this list amount to 21 out of 138, or about a sixth of the whole. Next, to make sure that I do not expose myself to the objection that “ some of these common types are also represented in Australia or other

distant lands south of the equator," I have endeavoured to make sure that none which I cite can come under that category; so that my argument cannot be touched by it. At the same time, I may say that I do not know to what species Mr. Bentham refers as falling under that category. I know of none. Lastly, as regards the opinion with which he closes, that "from a very early period in the history of organic life the broad Atlantic from the southern tropic to far into the north temperate region has been an impassable gulf for terrestrial organisms," I have only to say, "So be it, I do not dispute it." Carry back the date to as early period as you will; all I say is that at some period, and *that* a period subsequent to the appearance of the present forms of Coleoptera, the broad Atlantic was traversed, in at least two directions, and probably at three different times, by a stretch of dry land which united West Africa with Brazil, which united Patagonia with the Cape, and which, last of all and probably not without relation to the preceding, united Brazil with Madagascar.

At the outset I endeavoured to show the long-continued persistence of the present forms of Coleoptera; I pointed out that in the Miocene times they almost all come within our existing genera, that the same facies already existed in the Coal-epoch; and I do not suppose that Mr. Bentham or any one else will exact a higher antiquity for the Atlantic than that time; or if they do, there seems no reason why, since the forms of our Coleoptera have endured for so long a period, they should not stretch as much further back as any friend of the Atlantic may choose to carry its age.

On the strength, then, of the presence of the Brazilian types which I have shown to exist in West Africa, I think I am entitled to infer the former union of Brazil and that country. Now West Africa is almost entirely destitute of microtypal forms: there are a few; but their proportion is so trifling that it sufficiently indicates that they form no part of the original stirps, and are to be regarded as intruders who have made their way in from abroad. But if West Africa has little microtypal intrusion, no distinct fauna has more than Brazil; and it might reasonably be anticipated that, if the two countries had been united, a portion of the microtypal stirps would have filtered into West Africa through Brazil; but we do not find it to be so. Not only are there few microtypal genera in West Africa, but those which exist are not species whose origin we should think of referring to Brazil:



generally speaking, it is not difficult to suggest their source. This absence of microtypal Brazilian forms is shown in a remarkable manner by the Staphylinidæ, an immense family which, as I have already shown, is (with the exception of one small branch of it which has found its way into India and East Africa) now entirely confined to and very characteristic of microtypal lands. I have explained that that family is entirely absent in Old Calabar; and I believe it is equally so throughout West Africa. In the Brazilian district, on the contrary, it is widespread, and in some places abundant, especially Columbia and the districts adjoining the Andes. It would seem to follow from this, that the union between West Africa and Brazil must have existed and been brought to a close before Brazil itself received its microtypal element, at all events before it possessed Staphylinidæ, which seem to have been a late acquisition. There was thus a time when the Brazilian Coleopterous fauna was of pure unmixed type of the same character as that which it has communicated to West Africa; in other words, I have been right in classing the Brazilian as a great distinct stirps. That period must have been prior to its union with the rest of South America; for all round it is microtypal; and it must have been prior to its existence as an island, which, on other grounds, we know to have been a phase through which it passed. I have, in my 'Geographical Distribution of Mammals,' given a map which shows the form through which it probably passed when it and Venezuela and Guyana were islands—a separation which created subfaunas which still subsist, well marked and well defined, although the general type is unmistakably the same.

The way in which I read its history by these lights is:—first, that a great continent extended across what is now the Atlantic, from Brazil to West Africa, shut off by an ocean from the Andes or nearest land to the west (wherever that may have been), on the one hand, and from Eastern and Southern Africa, on the other; that this continent next sank in the middle and the Atlantic took its place; that, according to the laws of gravity and equilibrium, as its centre sank, its two ends and their shores rose, uniting West Africa to the rest of its continent, and Brazil to the Andes or western microtypal land. And as the sea-bed to the west became bare and dry, the Staphylinidæ and other microtypal forms rushed in from the west and the Brazilian types from the east; and, the ground being free, both established themselves together, under the

law to which I have already referred as regulating the introduction of new species to new countries, viz. that if it be full, they make little way—if empty, rapid progress.

I make these flying shots at a covey of dates ; not that I imagine that difficult problems like these are to be unloosed by crude generalizations from the few uncertain facts of doubtful import which we possess, but as illustrations of the kind of use to which some of the principles which I see only dimly looming through the haze, but which I do believe to have truth and substance in them, may be put when we have got more facts and know better how to use them. One fact seems to shine clear out of the mist ; and that is that in all those countries where different types have made good their footing, the races seem to preserve their identity for all time, mixed but never blending, approximated but never amalgamated. If hybridism be an agent at all in the production of new species, it certainly carefully confines itself to its own type.

The islands in the Indian Ocean between India and Africa (Mauritius, Réunion, &c.), exclusive of Madagascar and its immediate dependencies, are partly Indian, partly African and Malagasse. Madagascar is a land of wonders, not only for what it contains, but for its relations with other countries. The basis of its fauna is African ; but it has also elements of its own, some of which may be traced far off, and in countries which have lent it something in return. We do not yet know how these peculiarities are distributed in the island. One collector goes to Madagascar, and he finds little or nothing but common African forms. Another goes to some other part of the island (some of them, especially the older ones, have not been so particular as we now find it necessary to be in reporting the localities searched and their products), and he sends home the most wonderfully attractive and strange forms it is possible to conceive. A double fauna is certainly represented there—one African and the other American—some have said allied to North America, others to Mexico, and others to Brazil. It is a slight tincture of the Brazilian stirps which is found in all three. The African connexion will, I dare say, be admitted. The Brazilian is proved by the presence in Madagascar of various representatives of Brazilian forms. Thus *Polybothris* represents the Brazilian *Psiloptera* ; *Doryscelis* represents *Gymnetis* ; *Stigmatrachelus*, *Platyomus* ; *Peltis Ivanii* is found in both ; but by far the most convincing instance is a moth of the genus *Urania* (to my mind, the most gorgeous Lepi-

dopterous insect in existence). It is an unusual thing at any time to meet with a gay-coloured moth ; but one with metallic brilliancy is still rarer : *Urania* exceeds any thing I know in this respect ; and it stands *per se*, nothing else like it in any other genus. Of this genus there are six species—one in Madagascar (*Urania Ripheus*), and the other five within the range of the Brazilian fauna, viz. two in Brazil (on the Amazons), another in Venezuela, one in Cuba, and one in Jamaica. *Stelidota octomaculata* is an example of affinity with North America. The mammal *Solenodon* of the West Indies has been claimed as allied to the Madagascar *Centetes* (this, I think, on insufficient grounds) ; but Madagascar is the only place where (with one exception) Iguanoid lizards occur out of America, and the only place in the Old World which furnishes examples of the American Colubrine forms *Xiphosoma* and *Heteroda*. The Lemurs, too, as I have elsewhere argued, are perhaps more nearly related to the Opossums or Squirrels than to the Monkeys ; and if it be to the Opossums, that would be a link the more with Brazil. It is to be observed that all these affinities are confined to Madagascar and do not touch South Africa. According to my views, they are insoluble except by the supposition of a dry-land communication between Madagascar and South America. My conjecture is that when the communication between Patagonia (the penultimate) and the Cape was interrupted by the sinking of the land, all the land did not sink. The ground now occupied by Patagonia did sink ; the land next Africa also sunk, but a mountain-range survived running from Cape Frio (Rio Janeiro) obliquely across the Atlantic to a point a little to the south of the Cape of Good Hope, there rounding the Cape and running up to Madagascar exactly in the shortest line that a ship could sail directly from Rio Janeiro to Madagascar. It may seem too child-like and direct to the purpose to propose such a route ; I felt it so until I studied the sea-bottom, when I found that there a broad raised ridge does run along the bottom of the sea exactly in the direction I have laid it down. I was not aware of this until I saw it so mapped in a map of the bed of the Atlantic in Mr. Keith's Johnston's New Physical Atlas. No one will dispute the importance of the configuration of the bottom of the sea as an indication of the line of ancient continents ; and on the strength of this and of the fauna of Madagascar, I think I have very fair grounds on which to base my hypothesis. Being a ridge, it would continue so when above water, and not

appear as a plain like the desert Patagonian junction, but a mountainous or hilly country which would be watered by streams, clothed with forests and fitted for the habitation of such sparkling creatures as the *Urania*; for we see that nature always assimilates the aspect of the inhabitants of a country more or less to its prevailing hue; and where forests and flowers and dewdrops abound, there she clothes them in her most gorgeous robes.

It may be that the last scene of all of this strange eventful history, prior to the appearance of the land as it now stands, was the extension of the microtypal regions of Cape Horn out to Kerguelenland, whereby the antarctic islands had already received their present flora, an extension which must have subsisted until a comparatively recent period, at least subsequent to the glacial epoch; otherwise I do not see how these islands could have been reintegrated in the possession of their flora after the retreat of the ice. As regards the bridge or range to Madagascar, that must have been its last scene; for otherwise we should not have it preserving its position and contour at the bottom of the sea.

Africa itself is not difficult to read. Subject to the modifications of which I have been speaking, the whole of the eastern half of the continent is one broad band composed of one fauna.

Lay a parallel ruler on the map, with one limb along the east coast and the other limb drawn back as far west as Congo on the west coast, and you have the region I refer to pretty fairly marked out. It includes Abyssinia, Somali-land, Mozambique, Natal, the Cape, Namaqua-land, and Angola. A succession of great lakes and deserts is known to mark out part of the western margin of this region; to the west of it, or rather of the barrier so composed, we have what I may call an island surrounded by a nearly dry ditch, viz. the unknown region between Gaboon and the Congo on the south, a moat only partially supplied with water, the Albert-Nyanza line of lakes on the east, the Sahara on the north, and the Atlantic on the west. The countries of which this island is composed are, Senegal, Guinea, Old Calabar, and Gaboon. While it has a large share of the general African element of the eastern side of the continent, it has also specialities of its own, and superinduced upon it the very perceptible flavour of Brazil of which I have already spoken.

In fixing the southern limits of this South-American element in West Africa, I have been guided partly by the descriptions



of the Coleoptera of Angola, published by Erichson in Wiegmann's 'Archiv,' in 1848, as corrected by Wollaston's removal of the Cape-Verd species, which the death of the collector, Grossbentner, had occasioned to be confounded with the general Angolan collection, and partly by the collections made by Dr. Welwitsch. The Fellows of the Linnean Society know Dr. Welwitsch chiefly as a botanist, or, perhaps, through his and M. Morelet's recent work 'On the Mollusca of Angola,' as a conchologist. But his entomological collections are not less admirable in every respect than his botanical; and through his liberality and kindness I have had the advantage of studying in them an amount of material greatly exceeding in extent the collection described by Erichson. From it I am enabled to say that the Brazilian element does not come south into Angola. The type of the Angolan Coleopterous fauna is Caffrarian beyond any question.

The Brazilian stirps should alone now remain to be treated of; but in speaking of other regions I have already said by anticipation every thing that I have to state regarding it.

There is one point, however, on which I have a general remark to make, which is also specially applicable to it. In Columbia and some of the border-lands nearest the microtypal stream in the Andes we see many fine, rich, glowing metallic species, which, from their size and beauty, we are naturally led to refer to the Brazilian stirps, but which in reality belong to genera which, without doubt, are naturally microtypal, as *Harpalus*, *Philonthus*, *Xantholinus*, *Staphylinus*, &c. When we have to determine to which stirps such species belong, we must discriminate between the natural brilliant elements of the Brazilian fauna and the superadded brilliancy developed upon microtypal forms by the special conditions of the locality. Columbia and Ecuador abut on the eastern margin of the microtypal range in Equatorial America, and a modification of the stirps is to be expected there. Mexico, Central America, the West Indies, New Granada, Columbia and Ecuador, Cayenne, and in some cases even Venezuela are to be regarded as debatable lands, in which the true character of the stirps to which the species inhabiting them belong is to be determined, not by the place in which they are found, but by a sound consideration of their affinities and distribution elsewhere.

## APPENDIX.

TABLE I.—Showing the actual present distribution of the following existing genera recorded to have been found in the Miocene beds of Oeningen, Radoboj, Rott, Aix in Provence, and Iceland.

EXPLANATION.—A single asterisk means that the genus occurs in the countries indicated by it.

A double asterisk that it occurs in force.

Where numbers are given, they indicate approximately the number of species known to occur in the country in question (note 1).

1. *Coleoptera*.

Genera.	Microtypal stirps. (note 2)								Debatable lands.			Brazilian stirps.	Indo- African stirps.			
	Europe.	Asia.	N.-E. America.	N.-W. America.	Chili.	Australia.	New Zealand.	Polynesia.	Between N. and S. America.	Between Asia and India.	Between Europe and Africa.	Brazilian region.	India.	W. Africa.	S. Africa.	Madagascar.
Cymnidis .....	30	36	34	4	3	3	...	...	9	1	2	...	...	...	2	...
Brachinus .....	**	**	**	*	*	...	...	...	*	...	*	*	*	*	*	*
Anchomenus (note 3) .....	42	35	61	13	12	3	3	4	5	...	...	12	...	3	3	...
Feronia (Argutor).....	**	**	**	*	*	**	*	*	*	...	...	*	*	2	*	*
Harpalus .....	**	**	**	*	*	*	...	*	*	*	...	*	*	*	*	*
Bembidium .....	**	**	**	*	**	...	...	*	*	...	...	...	...	*	*	*
Palæobius .....	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Agabus .....	**	*	**	*	*	...	...	*	*	...	...	*	...	...	...	...
Colymbetes .....	**	*	**	*	*	*	*	*	*	...	...	...	...	...	*	...
Dytiscus.....	**	*	**	*	...	*	*	...	...	...	...	*	...	...	1	...
Hydrophilus .....	*	*	*	*	*	...	...	...	*	...	...	*	*	...	*	*
Hydrous .....	*	*	*	*	*	...	...	...	*	...	...	*	...	...	*	...
Hydrobius .....	*	*	*	*	...	*	...	*	...	...	...	...	...	...	*	...
Philhydrus .....	*	*	*	*	*	...	...	*	...	...	...	...	...	*	*	*
Laccobius.....	*	*	*	*	...	...	...	...	...	...	...	...	...	...	*	*
Ochthebius .....	19	...	2	3	...	...	...	...	...	...	...	...	...	...	1	...
Tachyporus (note 4).....	**	*	**	...	*	...	...	...	...	...	...	...	...	...	...	...
Philonthus.....	**	**	**	*	*	*	*	*	*	...	*	*	*	...	*	*
Staphylinus .....	24	15	8	5	?	2	1	1	8	1	...	58	1	...	10	1
Xantholinus .....	*	*	*	...	...	*	*	...	*	...	*	*	*	...	*	*
Lithocharis .....	*	?	*	...	*	...	...	...	*	...	...	*	...	...	*	...
Sunius .....	*	...	*	...	...	...	...	*	*	...	...	...	...	...	*	...
Stenus .....	**	*	*	...	*	...	...	...	*	...	...	*	...	...	*	*
Oxyporus .....	*	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
Anthophagus.....	*	...	*	*	...	...	...	...	...	...	...	...	...	...	...	...
Omalium .....	**	*	**	...	...	...	...	...	*	...	...	...	...	...	*	...

1. *Coleoptera* (continued).

Genera.	Microtypal stirps.							Debatable lands.			Brazilian stirps.		Indo-African stirps.			
	Europe.	Asia.	N.-E. America.	N.-W. America.	Chili.	Australia.	New Zealand.	Polynesia.	Between N. and S. America.	Between Asia and India.	Between Europe and Africa.	Brazilian region.	India.	W. Africa.	S. Africa.	Madagascar.
Scaphidium .....	*	*	*	*					*			*			*	
Amphotis .....	*	*	*	*												
Peltis .....	*	*	*	*												
Corticaria .....	**	**	*	*									*	*	*	*
Trogosita .....	**	*	*	*				*								
Dermestes .....	*	*	*	*	*		*	*					*	*	*	
Byrrhus ( <i>note 5</i> ) .....	*	*	*	*									*	*	*	
Gymnopleurus .....	*									*	**		*	*	*	*
Onitis ( <i>note 6</i> ) .....	*	*	*	*		*				*	*		*	*	*	*
Onthophagus .....	**	*	*	*		*			*	*	*	*	*	*	*	*
Aphodius ( <i>note 7</i> ) .....	**	*	*	*	*	*		*	*	*	*	*	*	*	*	*
Melolontha .....	*	*	*	*	*				*	*	*	*	*	*	*	*
Rhizotrogus .....	*	*	*	*							*		*	*	*	*
Anomala .....	*	*	*	*	*	*			*		*	*	*	*	*	*
Anoplognathus ( <i>note 8</i> ) .....					*	*										
Pentodon ( <i>note 9</i> ) .....	*	*	*	*												
Trichius .....	*	*	*	*					*							
Capnodis .....	*	*	*	*												
Perotis .....	*															
Ancylocheira ( <i>note 10</i> ) .....	*	*	*	*	*	*									*	
Eurythyrea .....	*	*	*	*				*							*	
Dicercia .....	*	*	*	*	*											
Sphenoptera .....	*	*	*	*		*									*	
Agilus .....	*	*	*	*	*	*		*	*		*	*		*	*	
Ampedus ( <i>note 11</i> ) .....	**	*	*	*	*	*		*	*		*	*		*	*	
Ischnodes ( <i>note 12</i> ) .....	*	*	*	*	*	*			*		*	*	*	*	*	
Cardiophorus ( <i>note 13</i> ) .....	*	*	*	*	*	*				*	*	*	*	*	*	*
Diacanthus ( <i>Corymb. Cand.</i> ) .....	**	*	*	*	*	*	*		*	*	*	*	*	*	*	*
Limonius .....	*	*	*	*	*	*			*	*	*	*	*	*	*	*
Lacon .....	1	2	2			13			6	1			33	3	9	23
Adelocera .....	7	2	4	1	1			2	4			6				3
Luciola .....	**	*	*	*	*	*	*	*			*	*	*	*	*	*
Telephorus ( <i>note 14</i> ) .....	**	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Malachius .....	**	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Clorus ( <i>note 15</i> ) .....	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Ptinus .....	**	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cis .....	**	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lytta .....	9	18	40	24	6				8		1	48	8	15	11	
Meloe .....	*	*	*	*	*				*				*	*	*	*

1. *Coleoptera* (continued).

Genera.	Microtypal stirps.								Debatable lands.			Brazilian stirps.	Indo-African stirps.			
	Europe.	Asia.	N.-E. America.	N.-W. America.	Chili.	Australia.	New Zealand.	Polynesia.	Between N. and S. America.	Between Asia and India.	Between Europe and Africa.		India.	W. Africa.	S. Africa.	Madagascar.
Cistela .....	*	*	*	*	...	*	...	...	...	...	...	...	*	*	...	...
Mycterus .....	*	...	*	*	...	...	...	...	...	...	...	...	...	...	...	...
Gonocephalum ( <i>note 16</i> ) ..	*	*	*	...	...	*	...	*	...	...	*	?	*	*	*	...
Microzoum .....	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Boletophagus ( <i>note 17</i> ) ..	*	*	*	...	*	*	*	*	...	...	...	...	*	...	...	...
Uloma ( <i>note 18</i> ) .....	*	?	*	?	*	...	*	*	*	...	...	...	...	*	...	...
Platydemia .....	*	*	*	*	*	*	...	*	*	...	...	**	*	*	*	*
Myodites .....	*	...	*	*	...	...	...	...	...	...	...	...	?	...	...	...
Urodon .....	*	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...
Choragus .....	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bruchus .....	*	*	*	*	*	*	...	...	*	...	...	*	*	*	*	...
Rhynchites .....	55	12	3	1	2	...	...	...	23	...	...	9	3	...	5	...
Apion ( <i>note 19</i> ) .....	322	11	13	8	3	...	1	...	26	...	...	17	18	...	11	...
Brachycerus ( <i>note 20</i> ) ..	41	5	...	...	...	...	...	...	...	...	...	...	1	3	186	3
Hipporhinus ( <i>note 21</i> ) ..	...	...	...	...	...	2	...	...	...	...	...	...	...	...	76	...
Sitona .....	100	3	2	6	...	...	...	...	...	...	...	...	...	...	...	...
Hylobius .....	22	3	5	?	...	1	...	...	...	...	...	3	...	...	...	...
Cleonus .....	240	35	2	...	...	...	...	...	...	...	...	...	4	12	15	...
Larinus .....	97	5	1	...	...	...	...	...	...	...	...	...	1	7	...	...
Lixus .....	150	6	8	16	7	1	...	...	5	...	2	7	7	10	30	5
Rhinocyllus .....	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phytonomus .....	149	8	2	3	...	...	...	...	...	...	...	2	...	1	3	...
Cryptorhynchus .....	5	4	11	10	6	6	...	8	33	...	...	93	9	8	2	2
Magdalinus .....	50	...	6	2	...	1	...	...	...	...	...	3	...	...	...	...
Tychius .....	88	4	3	...	4	1	...	...	...	1	...	1	...	1	4	...
Acalles ( <i>note 22</i> ) .....	95	1	1	...	19	6	...	11	3	...	...	8	1	...	...	...
Ceuthorhynchus .....	**	**	*	*	*	...	...	...	...	...	...	...	...	...	...	...
Nanophyes .....	25	...	...	...	...	1	...	...	...	...	...	...	...	...	2	...
Sphenophorus .....	14	2	27	15	10	2	...	3	46	...	...	15	13	4	8	...
Cossonus ( <i>note 23</i> ) .....	**	...	*	*	*	*	...	*	*	...	...	*	*	*	*	...
Hylesinus .....	*	...	*	...	...	...	...	...	...	...	...	*	...	...	*	...
Clytus .....	*	*	**	...	*	*	...	...	*	*	...	*	*	*	*	...
Mesosa .....	*	...	*	*	...	...	...	...	...	...	...	...	...	...	...	...
Acanthoderus .....	*	*	*	*	*	...	*	...	**	...	...	**	...	...	...	...
Lamia ( <i>note 24</i> ) .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saperda .....	*	*	*	*	...	*	...	*	...	...	...	*	*	*	...	...
Dorcadion ( <i>note 25</i> ) .....	*	*	...	?	...	...	...	...	*	...	...	...	...	...	...	...
Hesthesis .....	...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...
Donacia ( <i>note 26</i> ) .....	**	**	**	*	...	...	...	...	...	...	...	...	*	*	...	...



1. *Coleoptera* (continued).

Genera.	Microtypal stirps.								Debatable lands.		Brazilian stirps.	Indo-African stirps.				
	Europe.	Asia.	N.-E. America.	N.-W. America.	Chili.	Australia.	New Zealand.	Polynesia.	Between N. and S. America.	Between Asia and India.	Between Europe and Africa.	Brazilian region.	India.	W. Africa.	S. Africa.	Madagascar.
Labidostomus .....	*	*														
Cassida .....	46	11	4	1	2	3	...	...	3	3	.....	7	27	25	40	5
Lina .....	*	*	*		*				*			**	*		*	
Plagioderæ.....	*	*	*						*				*		*	
Chrysomela .....	*	*	*										*		*	
Oreina .....	*	*	*			*							*			
Gonioctena.....	*	*	*			*							*		*	
Coccinella (note 27).....	**	**	**	*	*	*	*	*	*	*	?	*	*	...	*	*
Lasia .....	*	*														

*Notes to 1. Coleoptera.*

*Note 1.*—This Table is made up to show the distribution of particular forms. On this point, the relative number of species is a secondary consideration; and even were it not so, we could not use it; for the statistics we have are, for any purpose requiring accuracy, wholly unreliable, from insufficient exploration and imperfect knowledge of the contents of different countries, from unnatural dismemberment of forms into new genera, and from the inaccuracy or carelessness of describers, who, besides describing, as new, species which have been already described, have multiplied or diminished the number of species, each according to his own notions of what constitutes a species. To say nothing of the number, however, might sometimes lead to an undue idea of the strength of representation of the same genera in different countries; I have therefore occasionally added the approximate numbers of the species known in each district, when it could be done without much trouble and with some approach to accuracy. Where I have not given the numbers I have marked the dis-

tracts where the genus is strong by a double asterisk, where weak by only one. My numbers, where given, have no pretence to more than a general approximation: for my purpose this is enough; and I believe they will be found sufficiently near to answer it.

*Note 2.*—The geographical regions in this Table are:—

1. Europe, including the Mediterranean district, North Africa as far south as the southern margin of the Sahara, Syria, Asia Minor, and the shores of the Black Sea.

2. Asia, north of the Himalayan range, from the Ural mountains and Caucasus eastward to the Pacific.

3. North America east of the Rocky mountains.

4. North-west America from Behring's Straits to Mexico.

5. The Chilian region, including the whole of South America to the west of the Andes, the part of Peru in the Andes, part of the South of Bolivia, and the western and southern part of Paraguay, also La Plata, Patagonia, and Terra del Fuego.

6. Australia, including Van Diemen's Land. I should have wished to divide Australia into the northern and the southern halves; but as yet our materials are insufficient to allow this to be done. More attention is now bestowed on localities; and I trust it will not be long before we can fairly allot the different portions of the Australian fauna.

7. New Zealand.

8. Polynesia. In this I include the islands between Australia and Chili, except New Zealand.

9. Debatable land between North and South America, including Florida, New Mexico, Mexico, Central America, and part of Columbia, New Granada, and Cayenne. I have added this and the two following columns of debatable land for the purpose of as much as possible keeping the elements of the faunas on either side of it free from what may have been a foreign influence. The reader can carry it to the credit of either as seems to him agreeable, or omit it altogether.

10. Debatable land between the East Indies and Asia, including the Himalayas, Nepal, Silhet, the Burmese mountains, part of China, &c.

11. Debatable land between North Africa and the northern frontier of Senegal.

12. Brazilian region, the parts of South America lying east of the Andes and not above disposed of.

13. The Indian region, including the East Indies, the Malayan Peninsula, the Indian Archipelago, Siam, Cochin China, the south of China, the Philippine Islands, and New Guinea. In any list for more general purposes, New Guinea and the Philippine Islands should be kept separate; but, looking at the genera I have to deal with, this is not necessary here.

14. The West-African region, consisting of the country from Senegal to Gaboon inclusive, and eastward until it meets the East African region, wherever that may be (probably in the line of the lakes).

15. South Africa, containing Angola, Caffraria, Natal, Mozambique, and northward to Somali-land. The south of Arabia also, I believe, properly belongs to this province; but it does not happen to come into question here.

16. Madagascar. I do not include in it the neighbouring islands of Bourbon, Mauritius, Rodriguez, &c., although they do belong partly to it and partly to India; but the points in which they correspond with it are those in which Madagascar also coincides with Africa; and my object in keeping Madagascar separate is not to show its relation to Africa or India, but its more unexpected relations with South America. When I have to deal with species from the smaller islands (Bourbon, &c.), I carry them to the credit of India or Africa, according to which the affinities of the species indicate.

*Note 3.—Anchomenus.* Some of these supposed Brazilian *Anchomeni* are, doubtless, as suggested by Lacordaire, *Dyscoli*; and of others the habitat is possibly erroneous. Several of the citations are of old date, when every thing from South America was ticketed Brazil; still there are undoubted species from Brazil.

*Note 4.—Tachyporus.* (Out of more than 250) only one occurs in Nepaul, doubtless a straggler, one in Bengal (which may have been derived from an Himalayan straggler), one in Java, and one in New Guinea.

*Note 5.—Byrrhus.* I include in this the allied genera, *Curimus*, *Cytilus*, *Morychus*, and *Amphicyrtus*.

*Note 6.—Onitis.* Tolerably numerous in Europe and Asia, but only one in North America, one in India, and one in Australia.

*Note 7.—Aphodius.* Only one recorded from Brazil, out of an

immense number which, with that exception, are found in the microtypal and Indo-African regions.

*Note 8.—Anoplognathus.* I have included under this head *Cotalpa* (North American) and *Brachysternus* &c. (Chilian).

*Note 9.—Pentodon.* Although not present as a genus in America, it may be present under some one or other of the American types of the Pentodontidæ, as *Podalgus*, *Heteronychus*, *Bothynus*, &c.

*Note 10.—Ancylocheira.* In this I include *Bulis* and *Asthæus*.

*Note 11.—Ampedus.* In this I include *Elater* and *Grammophorus*.

*Note 12.—Ischnodes.* By *Ischnodes* I suppose Heer to mean the second section of Candèze's *Anchastus*. The first section consists of three Brazilian species, which I omit. The second is distributed as in the Table, and, besides, contains one St. Helena species, *Anchastus atlanticus*.

*Note 13.—Cardiophorus.* Only one in Australia out of about 150 species.

*Note 14.—Telephorus.* I include *Podabrus* under *Telephorus*, not only on account of the indistinctness of the fossil specimens, but from the closeness of their natural relationship.

*Note 15.—Clerus.* I am not sure in what sense Heer intends *Clerus* to be used; and his figure scarcely helps us. I have taken it in the narrower sense in which it is now used.

*Note 16.—Gonocephalum.* In this I include *Opatrum*.

*Note 17.—Boletophagus*, including *Ulodes* and *Eledona*. I can find only one species recorded from India, without special authority. If from the Himalayas, it doubtless is a straggler from the north.

*Note 18.—Uloma.* The common species is introduced with cereals into all lands—which, as Lacordaire says, leaves its real native country in uncertainty; but, from its occurring in the Miocene fauna of Europe, it probably ought to be referred to Europe.

*Note 19.—Apion.* The debatable-land species are chiefly from Columbia, which is half microtypal.

*Note 20.—Brachycerus.* In this I include all the Brachyceridæ. It may be a question whether this form was originally African, and from Africa passed into South Europe previously to the Miocene times, or, being European, it subsequently found its way into Africa, which is now its head quarters.



*Note 21.—Hipporhinus.* Similar remarks apply to this.

*Note 22.—Acalles.* Largely represented both in itself and by allied genera in the Atlantic Islands.

*Note 23.—Cossonus.* Ditto.

*Note 24.—Lamia.* The genus *Lamia* is too large to know what type of it Heer referred his fossil to. I am in doubt and have had to leave this blank.

*Note 25.—Dorcadion.* I include the Mexican form *Monilema* as part of *Dorcadion* in this inquiry, not as otherwise a bad genus.

*Note 26.—Donacia.* Lacordaire, in speaking of the Indian and African species of *Donacia*, cites, as an interesting fact in regard to their distribution, that they have more analogy with the species of North America than with those of Europe. I cannot, however, see it.

*Note 27.—Coccinella.* The special genus or subgenus of a fossil *Coccinella* can scarcely be distinguished. I have therefore included several allied genera besides *Coccinella*, which makes it cosmopolitan. Strictly confined to the modern subgenus, it has been met with everywhere but in Polynesia and Madagascar. The vast numbers in which it has often been met with, and the appearance of flights of them migrating to other quarters, have probably something to do with its wide distribution.

## 2. Orthoptera.

Genera.	Europe and Asia.	North America.	Australia.	Chili &c.	India.	Africa.	Brazilian region.
Phaneroptera .....	*	*	...	..	*	..	*
Gryllacris .....	...	...	...	...	*	...	*
Cedipoda .....	*	*	*	..	*	*	*
Gomphocerus ( <i>note 1</i> ) ...	*	*	...	*	*	...	*
Mantis .....	*	*	*	*	*	*	*
Blatta.....	*	*	*	*	*	*	*

*Note 1.—Gomphocerus.* This genus is divided into two sections, of which the first is confined to Europe.

3. *Neuroptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chili and Polynesia.	India.	Africa.	Brazilian region.
<i>Termes</i> (note 1).....	*	*	*	* New Zeal.	*	*	*
<i>Agrion</i> .....	*	*	*	* Polynesia.	*	*	*
<i>Æschna</i> .....	*	*	*	* Polynesia.	*	*	*
<i>Cordulia</i> .....	*	*	*	* New Zeal.	*	S.Afr.	*
<i>Libellula</i> .....	*	*	*	* Polynesia.	*	*	*
<i>Phryganea</i> (note 2) .....	*	*	...	...	...	...	...
<i>Bittacus</i> .....	*	*	*	*	*	*	*
<i>Myrmeleo</i> .....	*	*	*	*	*	*	*
<i>Leuctra</i> .....	*	*	...	...	*	*	*
<i>Ictinus</i> .....	...	...	...	...	*	*	*

*Note 1.*—*Termes*. Almost entirely tropical now; but two or three small species still survive in Europe (France, &c.).

*Note 2.*—*Phryganea*. Used in the sense of *Phryganidæ*; *Phryganea* itself only occurs in the Europeo-Asiatic and North-American districts.

4. *Hymenoptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
<i>Xylocopa</i> .....	*	*	*	*	*	*	*
<i>Osmia</i> .....	*	...	...	...	...	S.Afr.	*
<i>Bombus</i> .....	*	*	...	*	*	...	*
<i>Anthophora</i> .....	*	*	*	*	*	S.Afr.	*
<i>Apis</i> .....	*	...	...	...	*	*	*
<i>Vespa</i> .....	*	*	...	...	*	...	*
<i>Formica</i> .....	*	*	*	*	*	*	?
<i>Ponera</i> .....	*	...	*	...	*	*	*
<i>Myrmica</i> .....	*	*	*	*	*	*	*
<i>Pompilus</i> .....	*	*	*	...	*	...	*
<i>Ichneumon</i> .....	*	*	*	*	*	*	*
<i>Anomalon</i> .....	*	*	*	...	...	*	*
<i>Cryptus</i> .....	*	*	*	*	*	*	*
<i>Acenites</i> .....	*	*	...	...	*	*	*
<i>Hemiteles</i> .....	*	*	*	...	*	*	*
<i>Tenthredo</i> .....	*	*	...	...	*	*	*

5. *Lepidoptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chil.	India.	Africa.	Brazilian region.
<i>Vanessa</i> (note 1).....	*	*	*	*	*	*	
<i>Psyche</i> (note 2) .....	*	*	*	...	*	S.Afr.	*

There are also four new fossil genera, which Heer calls *Pierites*, *Bombycites*, *Noctuities*, and *Phalenites*, which, he says, were respectively allied to *Pieris*, *Bombyx*, and the old genera *Noctua* and *Phalæna*, which are generally distributed.

*Note 1.*—Also found in the Navigator Islands.

*Note 2.*—*Psyche*. Used in the sense of Psychidæ. The recorded species of the restricted genus *Psyche* are confined to Europe and Ceylon.

6. *Diptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chil.	India.	Africa.	Brazilian region.
<i>Chironomus</i> .....	*	*	...	...	...	...	* Columb.
<i>Tipula</i> (note 1) .....	*	*	*	*	*	*	*
<i>Rhipidia</i> .....	*	*	...	...	...	...	*
<i>Limnobia</i> .....	*	*	*	*	*	*	*
<i>Mycetophila</i> .....	*	*	...	...	...	...	*
<i>Sciophila</i> .....	*	*	...	...	...	...	*
<i>Sciara</i> .....	*	*	...	...	...	...	*
<i>Rhyphus</i> .....	*	*	...	* N.Z.	...	...	*
<i>Plecia</i> .....	*	*	...	*	...	...	*
<i>Bibio</i> (note 2).....	*	*	*	* B.Ay	...	...	* Columb.
<i>Asilus</i> .....	*	*	*	*	*	*	*
<i>Leptogaster</i> .....	*	*	*	...	*	*	*
<i>Syrphus</i> .....	*	*	*	*	*	*	* Columb.
<i>Echinomyia</i> .....	*	*	...	*	*	*	*
<i>Anthomyia</i> .....	*	*	*	* B.Ay	*	*	*
<i>Cordylura</i> .....	*	*	*	*	*	*	*
<i>Tephritis</i> .....	*	*	*	*	*	*	*
<i>Merodon</i> .....	*	*	*	...	...	*	*

*Note 1.*—*Tipula*. Also occurs in New Zealand.

*Note 2.*—*Bibio*. Ditto.

## 7. Hemiptera

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
<i>Pachycoris</i> (note 1) .....	*	*	...	...	*	*	*
<i>Tetyra</i> (note 2) .....	*	*	...	...	...	*	*
<i>Cydus</i> .....	*	*	...	...	*	*	*
<i>Phlæcoris</i> (note 3) .....	...	...	...	...	...	...	*
<i>Pentatoma</i> .....	*	*	...	...	*	*	*
<i>Ælia</i> .....	*	*	...	...	*	*	*
<i>Halys</i> (note 4) .....	*	*	*	...	*	*	*
<i>Eurydema</i> .....	*	*	...	...	...	...	*
<i>Eusarcoris</i> .....	*	*	...	...	...	...	*
<i>Acanthosoma</i> .....	*	*	...	...	*	...	*
<i>Spartocerus</i> (note 5) .....	...	...	...	...	...	...	*
<i>Alydus</i> .....	*	*	...	...	*	...	*
<i>Hypselonotus</i> (note 6) .....	...	...	...	...	*	*	*
<i>Syromastes</i> .....	*	*	...	...	*	...	*
<i>Lygæus</i> .....	*	*	*	...	*	*	*
<i>Cephalocoris</i> (qu. <i>Cepha-</i> <i>locterus</i> ?) .....	...	...	...	...	...	?	*
<i>Pachymerus</i> .....	*	*	...	...	*	*	*
<i>Heterogaster</i> (note 7) .....	*	*	...	...	*	*	*
<i>Aradus</i> .....	*	*	...	...	...	...	*
<i>Tingis</i> .....	*	*	...	*	...	*	*
<i>Nabis</i> .....	*	*	...	...	...	*	*
<i>Harpactor</i> .....	*	*	...	...	*	*	*
<i>Pirates</i> .....	*	*	...	...	*	*	*
<i>Prostemma</i> .....	*	...	...	...	...	...	*
<i>Evagoras</i> .....	...	*	...	...	*	...	*
<i>Nepa</i> .....	*	...	...	...	*	*	*
<i>Diplonychus</i> .....	*	...	...	...	*	*	*
<i>Naucoris</i> .....	*	*	...	...	...	*	*
<i>Corisa</i> .....	*	*	...	...	*	*	*
<i>Micropus</i> .....	*	*	...	...	...	...	*

GENERAL EXPLANATION.—In the above Table the genera are taken in the sense in which they were employed by Burmeister.

*Note 1.*—*Pachycoris*. Burmeister's genus *Pachycoris* included European and Old-World forms; but these are now cut off, and the genus confined to American forms; yet there is little doubt that Heer used the word in its old and wider sense.

*Note 2.*—*Tetyra*. Heer, in this, doubtless meant the genus *Eurygaster*, Lap.

*Note 3.*—*Phlæcoris*, Burm.=*Phlæa*, Le P. and Serv., is exclusively South American.

*Note 4.*—*Halys*. Burmeister makes *Halys* very nearly equivalent to Dallas's group *Halydidæ*, in which case it is represented in both hemispheres; but the principal and more typical forms



are found in the Old World; two or three species occur in the south of Europe.

*Note 5.*—*Spartocerus*. If this genus is confined to *Spartocerus* proper, it seems to be exclusively American.

*Note 6.*—*Hypselonotus*. The same remark as on *Spartocerus*.

*Note 7.*—*Heterogaster*. This probably includes *Nysius* and *Cymus*.

### 8. Homoptera.

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Cicada .....	*	*	**	...	*	*S.Afr.	**
Pseudophania .....	*	*	...	...	*	*	*
Tettigometra .....	*	...	...	...	...	*	*
Cercopis .....	*	*	*	...	**	...	*
Aphrophora .....	*	*	*	*	*	*	*
Tettigonia .....	*	*	*	*	*	Madg.	*
Acocephalus .....	*	*	...	...	*	S. Afr.	*
Bythoscopus .....	*	*	*	...	*	*	*
Typhlocyba .....	*	*	...	...	...	S. Afr.	
Aphis .....	*	*					
Lachnus .....	*	*					
Pemphigus .....	*	*					

### 9. Arachnoidea.

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Limnochares ( <i>note 1</i> ) ...							
Argyroneta .....	*						
Gea ( <i>note 2</i> ) .....	...	...	...	...	*		

*Note 1.*—Information defective.

*Note 2.*—There is an East-Indian genus named *Gea*, but if the remarks by Dr. Thorell of Upsala (an able araneologist) are to be relied on (see ‘On European Spiders,’ by T. Thorell, Upsala, 1870, p. 225), the fossil spider *Gea* is a different species and genus from the existing East-Indian species *Gea spinipes*; and if so, *Gea* has no existing representative genus, though the family (*Epeirides*) is most numerous and diffused over the whole known globe.—O. P. CAMBRIDGE.

To the foregoing we may add the following, to complete the notice of Heer and Krantz’s lists, which go no further, viz.:—

10. *Crustacea.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Daphnia.....	*	*	*	*	*	*	?

11. *Polypi.*

Hydra .....	*	*					
Lucernaria.....	*	...	*				

TABLE II.—Showing the geographical distribution of the genera found in the middle and eastern (or next to America) portion of Polynesia.

Those which I suppose to have been introduced from microtypal sources subsequently to the establishment of the Brazilian and African types are marked with a †.

M. stands for Miocene, the genus being in Heer's lists.

Genera.		Doubtful.	Cosmopolitan.	Microtypal stirps.					Brazilian stirps.	Indo-African stirps.
				Europe and Asia.	North America.	Chili.	New Holland.	New Zealand.		
Plochionus.....		*								
Lebia .....		..	..	*	*	*	*	..	*	*
Chlænienus .....	M.	..	..	*	*	..	*	..	..	*
Harpalus .....	M.	..	..	*	*	*	*	..	†	†
Anchomenus .....	M.	..	..	*	*	*	*	..	..	..
Bembidium .....	M.	..	..	*	*	*	..	..	..	†
Colymbetes .....	M.	..	..	*	*	*	*	..	..	†
Agabus .....	M.	..	..	*	*	*	..	..	..	†
Gyrinus .....		..	..	*	*	*	*	..	*	*
Bolitochara .....		..	..	*	*	*	*	..	*	*

TABLE II. (continued).

Genera.	Doubtful.	Cosmopolitan.	Microtypal stirps.					Brazilian stirps.	Indo-African stirps.
			Europe and Asia.	North America.	Chili.	New Holland.	New Zealand.		
								Brazilian region.	India.
									Africa.
Placusa .....	...	...	*	*					
Staphylinus .....	M. ....	...	*	*	*	*	*	†	†
Philonthus .....	M. ....	...	*	*	*	*	...	†	†
Sunius .....	M. ....	...	*	*					
Zirophorus .....	...	...						*	
Lispinus .....	...	...		*				†	
Isomalus .....	...	...						*	
Chrysodema .....	...	...							*
Eurythyrea .....	M. ....	...	*						*
Agrilus .....	M. ....	...	*	*	*	*	...		†
Photophorus (peculiar to Polynesia, but allied to <i>Pyrophorus</i> , which is Brazilian) .....	...	...						■	
Dicrepidius (doubtful if really this genus, see Candèze) .....	...	...		*				*	
Monocepidius .....	...	...		*	*	*	...	*	†
Simodactylus, allied to <i>Eudactylus</i> .....	...	...				*	...	*	
Oophorus (the old genus of this name had no good characters; and as Candèze has broken it up and partitioned its contents, it is impossible to say where Fairmaire's insects should go; Candèze himself does not say, but suggests <i>Heteroderes</i> ) .....	*	...							
Adelocera .....	...	...	*	*	*	...	...	†	
Cylidrus .....	...	...				*	...	...	*
Tarsostenus .....	...	...	*	*			...	...	*
Tillus ( <i>Clerus</i> is the Miocene genus, but it may be held to include <i>Tillus</i> ) .....	M. ....	...	*	*	*	*	...	...	*
Corynetes .....	...	...	*	*	*	*	...	...	*
Carpophilus .....	...	...	*	*	*	*	*	*	*
Nitidula .....	...	...	*	*	*	*	...	*	*
Epurea .....	} M. ....	...	*	*					
Stelidota .....		...	*	*	?	...	...	?	?
Anthrenus .....	...	...	*	*	...	*	...	...	*
Dermestes .....	M. ....	...	*	*	*	*	*	?	*
Platysoma .....	...	...	*	*	...	*	...	...	*
Paromalus .....	...	...	*	*	...	...	...	...	*





TABLE II. (continued).

Genera.	Doubt ul.	Microtypal stirps.					Brazilian stirps.	Indo-African stirps.	
		Cosmopolitan.	Europe and Asia.	North America.	Chili.	New Holland.		Brazilian region.	Africa.
Acalles .....	M.	..	*	..	*	*	..	†	†
Sitophilus .....	..	*	..	..	..	..	..	..	..
Calandra .....	..	..	*	*	*	..	..	†	..
Dryophthorus .....	..	..	*	*	..	..	..	..	..
Cossonus .....	M.	..	*	*	*	..	..	..	†
Amorphocerus .....	..	..	..	..	..	..	..	..	..
Brenthus .....	..	..	..	..	*	..	..	*	..
Catolethrus .....	..	..	..	..	..	..	..	*	..
Proëces .....	..	..	..	..	..	..	..	..	..
Rhyncolus .....	..	..	*	*	*	..	..	*	*
Psepholax (resemble Scolytidæ).	..	..	..	..	..	..	..	..	..
Apate .....	*	..	..	..	..	..	..	..	..
Platypus .....	..	..	*	*	*	..	..	*	*
Temnorhopalon (position and affinities not known, supposed near <i>Cerylon</i> ).	..	..	..	..	..	..	..	..	..
Cicones .....	..	..	*	*	..	..	..	..	..
Ditoma .....	..	..	*	*	..	..	..	..	..
Cerylon .....	..	..	*	*	..	..	..	..	..
Emmagleus .....	*	..	..	..	..	..	..	..	..
Silvanus .....	..	..	*	*	..	*	..	†	..
Rhizophagus .....	..	..	*	*	..	..	..	..	..
Trogosita .....	..	..	*	*	..	..	..	..	..
Lamophilæus .....	..	..	*	*	..	..	..	..	..
Dendrophagus .....	..	..	*	*	..	*	..	..	..
Mallodon (belongs to the Remphanidæ) .....	..	..	†	..	*	..	..	Ph.	..
Obrium .....	*	..	..	..	..	..	..	*	*
Stromatium .....	*	..	..	..	..	..	..	..	..
Steirastoma .....	..	..	..	..	..	..	..	*	..
Ptychodes .....	..	..	..	*	..	..	..	..	..
Lagocheirus .....	..	..	..	..	..	..	..	..	..
Clytus .....	M.	..	*	*	*	*	..	*	*
Hesperophanes .....	..	..	*	*	*	..	..	*	*
Oopsis .....	..	..	..	..	..	..	..	..	..
Saperda .....	M.	..	*	*	..	*	..	..	..
Promecotheca .....	..	..	..	..	..	..	..	*	*
Raphidopalpa .....	..	..	..	..	..	†	..	*	*
Aulacophora .....	..	..	..	..	..	†	..	*	*
Cryptocephalus .....	..	..	*	*	*	*	..	*	*
Coccinella .....	M.	..	*	*	*	*	..	*	*

TABLE III.—Showing relations of genera found in New Caledonia. (From Montrouzier's Essay in Ann. S. Ent. 1860.)

Genera.	Microtypal.		Indo-African.	Brazil.	Universal.
	Europe, Asia, and N. America.	Australia.			
Cicindela .....	*	*	*	*	*
Distipsidera .....	...	*			
Cymindis .....	*				
Tricothorax, n. gen.					
Scarites .....	*	*	*	*	*
Chlænienus .....	*	*	*	*	*
Lissauchenius .....	...	...	*		
Ophonus .....	*				
Rembus .....	...	...	*		
Catascopus .....	...	...	*		
Feronia .....	*				
Abax .....	*				
Catadromus .....	...	*			
Bembidium .....	*				
Cybister .....	*	*	*	*	*
Colymbetes .....	*				
Copelatus .....	...	...	*	*	
Pachytes, n. gen.					
Dineutes .....	*	*	*	*	*
Ochthebius .....					
Stagnicola, n. g.					
Hydrobius .....	*				
Hydrophilus .....	*	*	*	*	*
Buprestis (Cyria?) .....	...	*			
Abrobapta (Melobasis) .....	...	*			
Diphucrania .....	...	*			
Agrypnus .....	*	*	*	*	*
Athous? .....	*				
Ludius .....	*				
Elater .....	*	*			
Nycterilampus.					
Laius.					
Lomechusa? .....	*				
Cylidrus .....	*	*	*	*	*
Clerus .....	*	*	*	*	*
Notoxus .....	...	*			
Necrobia .....	*	*	*	*	*
Ptinus .....	*	*	*	*	*
Ips .....	*				
Mycetophagus .....	*				
Dermestes .....	*	*	*	*	*
Trinodes .....	*				
Macrosternus .....					
Saprinus .....	*				

TABLE III. (*continued*).

Genera.	Microtypal.		Indo-African.	Brazil.	Universal.
	Europe, Asia, and N. America.	Australia.			
<i>Onthobium</i> (near <i>Tessarodon</i> ) .....	...	*			
<i>Aphodius</i> .....	*	*	*	*	*
<i>Sphæridium</i> .....	...	...	*		
<i>Rhizotrogus</i> .....	*	*	*	*	*
<i>Cyclocephala</i> .....	...	...	...	*	
<i>Hexodon</i> .....	...	*			
<i>Scarabæus</i> .....	*	*	*	*	*
<i>Ceratophyus</i> .....	*				
<i>Oryctes</i> .....	...	...	*	*	
<i>Megalæmus</i> , n. gen.					
<i>Lucanus</i> .....	*	*	*	*	*
<i>Ryssonotus</i> .....	...	*			
<i>Figulus</i> .....	...	*			
<i>Passalus</i> .....	...	...	*		
<i>Opatrum</i> .....	*				
<i>Toxicum</i> .....					
<i>Acanthosternus</i> .....		...	*		
<i>Neomida</i> .....	*				
<i>Diaperis</i> .....	*				
<i>Leptomorpha</i> .....	*				
<i>Pachycerus</i> , n. gen.					
<i>Tenebrio</i> .....	*	*	*	*	*
<i>Uloma</i> .....	*	*	*	*	*
<i>Tribolium</i> .....	*				
<i>Trogosita</i> ? .....	*	*	*	*	*
<i>Megapalpus</i> , n. gen.					
<i>Isopus</i> , n. gen.					
<i>Phaleria</i> .....	*				
<i>Adelium</i> .....	...	*			
<i>Ditylus</i> .....	*				
<i>Lagria</i> .....	*	*	*	*	*
<i>Mordella</i> .....	*				
<i>Telephorus</i> .....	*				
<i>Nacerdes</i> .....	*				

*List of non-microtypal Species in the Coleoptera of Polynesia, and their sources (all the rest are microtypal).*

- I. North America.—*Clytus erythrocephalus* and *Ptychodes vittatus*, Longicorns (timber-borers).
- II. Brazil.—*Lagocheirus araneiformis* and *Steirastoma stellio*, Longicorns (timber-borers); *Brenthus bidentatus*, a Brenthid (timber-species).

- III. East Indies and Philippine Islands.—*Chlœnius guttatus*, a Carabid (carnivorous hunting insect); *Hesperophanes luzonicus*, Longicorn (timber-borer); *Figulus fissicollis* (Lucanid), *Apate religiosa* (Xylophage), and *Eurythyrea scutellaris* (Buprestid)—timber-insects.
- IV. New Holland.—*Opsis nutator*, Longicorn (timber-borer); *Amarygmus hydrophiloides*, Heteromere, and *Apate pusilla*, Xylophage (timber-insect); *Nacerdes bivittata*, Heteromere, and *Staphylinus erythrocephalus*, Staphylinid (microtypal).
- V. New Zealand.—*Dendrophagus suturalis*, Cucujid (bark-insect); *Staphylinus oculatus*, Staphylinid (microtypal).
- VI. Cosmopolitan, origin doubtful.—*Plochionus bonfilsii*, Carabid.

List of Genera and Species found in the Europæo-Asiatic regions, and also in North-west America, but not in the eastern side of North America.

- I. Genera.—*Callisthenes*, *Miscodera*, *Leistus*, *Trachypachys*, *Pelophila*, *Anillus*, *Necrophilus*, *Pteroloma*, *Lyrosoma*, *Sphærites*, *Bolitochara*, *Syntomium*, *Phlœonæus*, *Arpedium*, *Deliphrum*, *Malachius*, *Calcar*, *Rosalia*, *Ergates*, *Mesosa*, *Timarcha*.
- II. Species belonging to other genera than the above.—*Platynus Bogemanni*, *Carabus Vietinghovii*, *Colymbetes dolabratus*, *Necrophorus mortuorum*, *Olisthærus megacephalus*, *Elater nigrinus*, *Corymbites confluens*, *Helodes variabilis*, *Dinoderus substriatus*, *Serropalpus striatus*, *Chrysomela lapponica*, *C. viminalis*.

List of Genera of Coleoptera of Old Calabar either Brazilian or with Brazilian affinities, taken from my "Coleoptera of Old Calabar" (so far as published) in the 'Annals and Mag. of Nat. Hist.'

*Galerita*, *Lia*, *Goniotropis*, *Hypolithus*, *Celina*, *Contipus*, *Axyra*, *Taracta*, *Platychora*, *Melittoma*, *Ptilodactyla*, *Dilobotarsus*, *Belionota*, *Parandra*, *Dorycera*, *Callichroma*.

Brazilian section.—*Ceme*, *Ædenoderus*, *Trachelophanes*, *Distenia*, *Smodicum*, *Stenochia*.

*Note*.—The other Tables referred to in the body of this paper, and which accompanied it, relate to matters which are more generally admitted; and it has therefore not been thought necessary to print them.



On a new Form of Cephalopodous Ova.  
By CUTHBERT COLLINGWOOD, M.A., F.L.S., &c.

(PLATE I.)

[Read February 3, 1870.]

THE large grape-like masses which constitute the ova of the common Cuttlefish (*Sepia*), are of so remarkable a form, and so commonly met with, that they attracted attention very long since. Aristotle, whose acquaintance with the reproductive bodies of the Tetrabranchiates was not far behind that of the present day, was no stranger to these large and singularly formed bodies; and they are commonly taken as the type of the spawn of Cephalopods. But the ova of this group differ considerably in size and appearance, as well as in the numbers produced by a single individual. In the case of *Sepia*, nature seems to have taken special care to preserve these important bodies, having encased them in a flexible horny covering, prolonged at one extremity into a kind of tendril or filament, which entwines round some fixed object which serves an anchorage. In the Poulp (*Octopus*), Aristotle informs us that a shell, or some such convenient *nidus*, receives the eggs, which adhere to it and are thus in some degree, at least, protected from injury. In *Loligo*, &c., great numbers of ova are produced: cylindrical sheaths of a gelatinous consistence are formed, each about 4 inches long and about  $\frac{1}{4}$  inch in diameter, and tapering at the free ends, the opposite ends being all attached to some foreign body by filamentary processes from  $\frac{1}{2}$  an inch to an inch in length. In each of these radiating bodies there may be 200 capsules, each of which contains from 30 to 40 minute spherical ova. In *Sepioteuthis* there appears to exist an intermediate form of ova, which connects the radiating sheaths of *Loligo* with the large capsular ova of *Sepia*. The ova are (as in *Loligo*) spherical, and enveloped in sheaths; but, as in *Sepia*, these are fewer and longer; while in the Di-branchiates the ova occupy a considerable space at the bottom of the shell, as, for example, in *Argonauta*.

In none of these, however, which represent the characters of the Cephalopodous ova, as far as known, is there any approach to the characters of a remarkable body which I recently discovered in the Atlantic Ocean, the nature, however, of which was incontestable. We were becalmed in lat. 37° N. and

long.  $28^{\circ}$  W., and the sea was swarming with beautiful objects, which I was watching from the chains, and making attempts to capture therefrom, when I saw an object which at once withdrew my attention from all the rest (the most familiar illustration I can give of its appearance would be to liken it to one of those cylindrical knitted comforters worn by ladies)—about 2 feet long and about 4 or 5 inches in diameter, closed at both ends, and floating expanded upon the surface of the water. The folds of the web were of a dark colour; and the web itself looked extremely delicate, so much so that, except at these apparent folds, it could scarcely be distinguished at all. At the same time I thought I should be able to hook it up entire, and fetched a grapnel for that purpose. I should have ill succeeded in the attempt, however, as it turned out; but the ship being at this juncture getting up steam and nearly ready to move, the first Lieutenant, Mr. Stewart, kindly lowered a boat for me as it drifted past. From the boat it could scarcely be perceived; and when, by directions from the deck, it was ultimately found, some difficulty was experienced in getting it into the boat; for, although it had appeared very solid and distinct in the water, it proved impossible to *drag* it up, and at the first attempt the mass slid away from the bucket placed under it, and, being so evenly balanced, disappeared, and could not be found again immediately. I was sadly afraid it would be lost; for our vessel was only waiting for the boat's return to steam away. Presently, however, it was found again; but in attempting to push it into the bucket, it broke in halves. Ultimately one of the halves was secured; and this was quite sufficient for the purpose. On close examination I was surprised to find that it consisted of a large mass of semisolid, perfectly transparent jelly; and what appeared to be the dark folds of the web were rows or clusters of round black spots, each of the size of a large pin's head, arranged in single rows along the outer part of the cylindrical mass of jelly, the rows not being regularly distributed, but running partially round its circumference, some for a longer distance than others. In some cases, two or three rows were placed close together side by side, and were separated by an interval from the next series, which might contain two or three rows or only one row of spots.

The spots appeared to be most thickly clustered about the edges of the body as it lay in the bucket, and least numerous

upon the central parts—an effect more apparent than real, and depending upon the cylindrical form of the mass. Although only half of the original mass was secured, the soft jelly having divided in getting it into the bucket, it had the appearance of an entire body, the fracture of the gelatinous mass not interfering with its symmetry.

Turning my attention now to the black spots, I at once saw, even without the aid of a lens, that they were egg-sacs containing young Cephalopods. These were extremely active, moving freely in the sacs and contracting their bell-shaped bodies as they leaped about in their narrow chambers. Each egg-sac was perfectly spherical and transparent, the circumference alone being visible, and was imbedded in the soft gelatinous transparent mass just as is the case with the spawn of the frog. The dark-coloured spots were entirely due to the coloured bodies of the embryo animals, which, in most cases, appeared to be just ready to be extruded. On placing the embryos under the microscope, I found that some of them were almost transparent, and exhibited their internal organization. The external surface of the bell was covered with epithelium of columnar form; and the same structure also extended over the arms. The bell was covered with dark-coloured spots—which in the most immature specimens were mere minute round specks, becoming in a further advanced condition irregular and angular as well as of a larger size. The eyes were large and prominent, and seated upon short and thick footstalks, and their dark pigmentary substance was distinctly visible through the transparent bell of the younger individuals. The arms were short, covered with epithelium upon the convex side, and having a few rudimentary acetabula upon their concave surfaces. Upon the upper part of the bell, on either side, was a small fin-like projection, visible even in the least-mature specimens.

Having secured this curious body, and examined its general form and appearance, and placed some of the embryos under the microscope, I was under the necessity of leaving it in a bucket of sea-water for two or three hours. When I returned to it at the expiration of that time, it appeared to have vanished. In some astonishment, I put my hand into the water, and found therein a large mass of soft transparent jelly, entirely invisible in the water. On closer inspection, I discovered that every one of the young embryos had been discharged from its sac, and that they

were lying in little heaps at the bottom of the bucket, either dead or dying. They had entirely lost the active movements which had at first distinguished them ; and an occasional contraction of the bell was the only sign of life which any of them exhibited. Those which I had myself separated from the mass, and previously placed in a tumbler of water, were by far the most lively ; and from these the accompanying figures were made.

On no other occasion did I meet with a body of this nature ; and the only thing I ever saw approaching to it in form was in the Indian Ocean, north of the Equator, when I one day observed something of the kind pass by, which had been a puzzle to me ever since ; for the rate at which we were steaming (ten knots) rendered it impossible to take any accurate note of it. Nor should I have been able to guess the character of the body I have here described, had I not been so fortunate as to secure it for closer examination.

The very great contrast which this body offers to the known forms of the spawn of Cephalopods in general is very remarkable ; and its singular resemblance to the spawn of the Amphibia is no less worthy of attention. What this may signify is a matter of interesting consideration. The embryo stages of this animal (of which I have preserved a few) will, of course, offer some, though a very imperfect, clue to its adult form, and to the determination of its genus. The presence of fin-like projections upon the upper portion of the bell seems to point out its separation from the genera *Eledone*, *Octopus*, *Tremoctopus*, and *Argonauta*, though to which of the pinnated genera (*Histioteuthis*, *Sepiola*, *Rossia*, *Sepia*, *Sepioteuthis*, *Verania*, *Onychoteuthis*, *Enoplateuthis*, *Loligo*, and *Loligopsis*) it may belong, or whether to some new genus, cannot now be determined. The body was evidently perfect in itself, and perfectly symmetrical ; and it is curious to observe so large a mass, and such a vast quantity of animals as the product of a single individual. Probably in it, as in the Frog during the breeding-season, the ovaries occupy the greater part of the body ; and probably, also, as is the case with the Frog, when the ova are deposited in the water, the jelly-like substance in which they are enveloped absorbs a large quantity of the fluid, so that the whole mass rapidly increases in volume until it becomes many times as large as the animal from which it was expelled.



These interesting questions may, it is hoped, yet be elucidated, and the affinities of the animal determined. In the mean time I have thought it best to bring forward the fact for the information of zoologists and physiologists.

#### DESCRIPTION OF THE PLATE.

A, natural size of ova. B, C, young cuttles under a 2-in. object-glass (24 diam.). D, an embryo, as seen under a 1-in. glass. E, F, arms ( $\frac{1}{4}$  in.), showing the rudimentary acetabula.

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Description of some new Species of Annelida and Gephyrea in the Collection of the British Museum. By W. BAIRD, M.D., F.R.S., &c.

[Read April 7, 1870.]

#### ANNELIDA.

##### 1. NEPHTHYS MACANDREWII, *Baird*.

Body elongate, tapering towards the inferior extremity, which terminates in one rather long seta. The sides containing the dorsal feet strongly ridged across. Proboscis rather short and rounded. Setæ of upper lobe of feet few in number and serrated near the tip; rather shorter and broader than those of ventral lobe, which are numerous and not serrated on the edges. Colour of the dorsal region, in the centre, of a pinkish hue.

Length about 6 inches.

*Hab.* Coruña, R. M'Andrew and H. Woodward, Esqs.

##### 2. NEPHTHYS IMPRESSA, *Baird*.

Body of a yellowish colour. Dorsal and ventral regions smooth, of a pearly, somewhat iridescent hue. Ventral surface marked with a bluish impressed line in the centre. Head small; antennæ indistinct. Proboscis rather long, cylindrical. Papillæ on the summit of it, round the mouth, rather large and fleshy, disposed in a series of 12 on each side. Feet on upper part of body small and close-set, becoming larger and more separate as they descend. Lamellæ ovate. Setigerous lobe rather large. Superior branchial process involute, large, twisted once and a half round. Setæ of setigerous lobe of three kinds:—one, short, curved at the tip and beautifully and minutely jointed; a second, simple, long, and slightly serrated on the outer edge; and the third, long, compound, the edges of the appendage minutely toothed on the edge, as is also the top of the shaft.

This species resembles very much the *Nephtys longisetosa*,

the chief differences being in the ventral cirrus or branchial process, the more decidedly serrated setæ, and the habitat.

Length about 4 inches.

*Hab.* Loto, coast of Patagonia, *Dr. Cunningham.*

### 3. *NEPHTHYS LUTREA*, *Baird.*

This species is considerably smaller than the preceding, but resembles it in most respects. The setæ of the feet are long; but instead of being serrated on one edge, they are divided across in numerous small joints or articulations.

In length it is only 2 inches.

*Hab.* Otter islands, coast of Patagonia, *Dr. Cunningham.*

### 4. *CLYMENE GROSSA*, *Baird.*

Body of a straw-yellow colour, much wrinkled on the surface, and thick. Head-lobe of considerable size and much wrinkled. Cephalic plate large and crenate on the upper edge; crenations about 12 in number, each crenation again having two slight crenations on the summit. First segment of body without setigerous feet. Three following segments with a fascicle of setæ only. The middle ones with a fascicle of setæ, and a lobe possessing numerous very short setæ on it.

Unfortunately the two Museum specimens are imperfect at the inferior portion.

*Hab.* Straits of Magellan, *Dr. Cunningham.*

### 5. *CLYMENE INSIGNIS*, *Baird.*

Body elongate; thickest in the middle, which exhibits a sort of sheath or tube in which the worm lives. Cephalic lamina very small, entire. Posterior extremity obliquely truncate, with no infundibuliform appendage. Segments of body very indistinct; one or two, of the anterior portion, without setæ; the other segments possess two rami. The anterior half of the body, exhibiting these setæ, is very large, and the setæ are very long and filiform. Posterior portion of body has the fasciculi of setæ small.

*Hab.* —? Taken during the Congo Expedition.

### 6. *SIPHONOSTOMA ANTARCTICUM*, *Baird.*

Setæ surrounding the head numerous, very short and fine. Branchiæ short, numerous. Head withdrawn. Body covered with an enveloping substance like that of most of the known species. Setæ of the inferior ramus of feet single, crooked or

hooked at the point, and of nearly a black colour. Colour of body varying from a very dark to a light brown, and of a transparent look.

Length of body in longest specimen nearly 3 inches.

*Hab.* New Zealand, *Dr. A. Sinclair.*

7. *MAGASCOLEX (PERICHÆTA) ANTARCTICA, Baird.*

Body consisting of about 180 rings. Setæ, surrounding the body, short, black, rather distant. Rings not keeled; larger and more distinct at the anterior extremity, closer at the posterior end, and all smooth.

Length 7 inches.

*Hab.* New Zealand.

8. *MEGASCOLEX (PERICHÆTA) SANCTÆ-HELENÆ, Baird.*

Body consisting of about 86 rings, which are more distinct at the two extremities than in the centre. The 11 or 12 rings at each end, have an acute ridge or keel in the centre; those of the middle portion of the body have the keel flattened. The body of the rings is finely striated. Setæ short, of a dark colour at the posterior extremity, rather distant from each other. In the centre of the body and at the anterior extremity they appear (in the specimen from which this description was drawn up) retracted, leaving only a mark where they are situated. The first 7 or 8 rings, at the anterior extremity, are strongly rugose or wrinkled.

Length from 1 inch and 9 lines to 3 inches.

*Hab.* High ground at St. Helena, *J. C. Melliss, Esq.*

9. *LUMBRICUS JULIFORMIS, Baird.*

Body of about 120 rings. Of a nearly black colour with metallic reflections. Rings smooth, narrow, close-set, slightly keeled in the centre. Setæ in four double rows, two ventral and two dorsal. Body of about equal size at each extremity. Lower extremity conical, pointed. The 10 or 11 anterior rings are the largest.

Altogether this worm resembles very much in appearance a species of *Julus*.

Length of medium-sized specimen  $2\frac{1}{2}$  inches.

*Hab.* —? Collected during the Antarctic Expedition.

10. *LUMBRICUS GUILDINGI, Baird.*

Body consisting of about 160 rings, narrow and close set

together. Setæ in four double rows on the back, each row very much approximated. No setæ on ventral surface. Colour of a pale straw hue. Rings have the surface corrugated; and the anterior ones are each slightly keeled in the centre.

Length 2 inches and 3 lines.

*Hab.* Island of St. Vincent, West Indies, *Rev. Lansdown Guilding's Collection.*

#### 11. LUMBRICUS RUBRO-FASCIATUS, *Baird.*

Body of a dirty yellow colour, banded across the back with a broad fascia of a red hue. The ventral surface is yellow. The red band extends across the centre of the segments. Anterior and posterior extremities both obtuse.

Length between 2 and 3 inches.

*Hab.* St. Helena, *J. C. Melliss, Esq.*

### GEPHYREA.

#### 1. ASPIDOSIPHON JUKESII, *Baird.*

Body nearly smooth, of a light straw-colour. Anterior shield dark, slightly granular, more slender than the posterior, which is of a lighter hue, and radiately granular. Granules very small.

Length about  $\frac{1}{2}$  an inch. Circumference about 3 lines.

*Hab.* Imbedded in a piece of coral from Lee Sandbanks, dredged in 14 fathoms, *J. B. Jukes, Esq.*

#### 2. ECHIURUS FARCIMEN, *Baird.*

This is a very large species, the middle-sized ones resembling in general appearance a large sausage. The two spines on the anterior portion are large and well developed. The hinder portion exhibits only one row of spines, instead of two as in most of the known species. The skin is leathery and smooth; the two extremities are bluntly pointed. The longest specimen we possess is about 16 inches long, the shortest fully 7 inches in circumference.

*Hab.* We possess five specimens of this species, all from Punta Arenas, on the coast of Patagonia. Collected by Dr. Cunningham, of the Surveying Expedition to the Straits of Magellan, to whom we are indebted for several species of Annelides above described.

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## On new Forms, &amp;c., of extra-European Trichopterous Insects.

By ROBERT M'LACHLAN, F.L.S.

(PLATES II., III. &amp; IV.)

[Read June 2, 1870.]

THE present paper may be regarded as a continuation of several memoirs by me on exotic *Trichoptera*, published in the 'Transactions of the Entomological Society of London' (Trans. Ent. Soc. ser. 3, vol. i. pp. 301-312, 492-496, vol. v. pp. 247-278). Many of the insects here noticed I owe to the liberality of my valued correspondent Mr. Henry Edwards, of San Francisco, from whom I had already, during his residence in New Zealand, received such substantial evidence of his desire to assist me by collecting these neglected insects, and who, since he has made Western America his home, has continued to help me. I have not, however, confined myself here solely to Californian species, but have added several remarkable forms from other parts of America, and also from the Old World. No doubt it is always advisable to restrict general papers of this nature within geographical limits; but this applies most forcibly to families which have already been made the subjects of general study. To follow this plan in exotic *Trichoptera* would be almost impossible, inasmuch as, though occasionally a considerable number of species may be collected in one locality by an entomologist who attends to other insects besides the almost hackneyed Butterflies and Beetles, many interesting forms must remain unnoticed in collections for years, because they are the results of only desultory observation on the part of collectors. This, therefore, must be my excuse for the scattered nature of the materials in this paper. When the day shall arrive when Neuropterists may be as plentiful as Lepidopterists, Coleopterists, and even Hymenopterists now are, it will then be absolutely necessary that workers should confine themselves, in each paper, within limits, either of locality, or family, or genus; to do that now would put a stop to all work, because, by the omission of any notice, collectors would fail to bestow any attention whatever on these insects, and the evil would be increased rather than mitigated. As in previous papers, I have endeavoured to illustrate by means of outline figures those intricate points of neuration and secondary sexual characters which form so essential a part in the

study of *Trichoptera*, and which can often be explained intelligibly by a few strokes of the pencil, however inartistic these may be, when words fail to illustrate the meaning.

It may not be out of place here to say a few words on the systematic position of the *Trichoptera*. The remarks that follow have, to a certain extent, been excited by a recently published American work, by Dr. J. S. Packard, jun., entitled a 'Guide to the Study of Insects,' a work strikingly original in its conception, and one which will doubtless do much towards furthering the already rapidly increasing taste for entomological studies in the United States. But it is necessary, first of all, just to glance at the position generally accorded to the *Neuroptera*. It has long been seen that the order, as defined by Linné, is composed of most incongruous materials; and Erichson attempted an amelioration of this condition by grafting all those families with incomplete metamorphosis upon the *Orthoptera*, still maintaining the two orders in juxtaposition. Since his time various authors have made this division, termed *pseudo-Neuroptera*, a veritable refuge for the destitute. To it have been added, from time to time, *Mallophaga*, *Thysanura*, *Thysanoptera*, and even the *Strepsiptera*, for no other reason, so far as I can see, than that they would not fit in satisfactorily elsewhere; and the characters of the order being so elastic, it was easy to find some peculiarities which gave these outlying families admission therein. That the Linnean families grouped now with *Orthoptera* have more affinity thereto than to the *Neuroptera* as usually constituted, is evident; yet I see no reason whatever why the *Odonata* should not form an order apart, possessing, as they do, characters absolutely *sui generis*. The admission of them into *Orthoptera* renders an already heterogeneous order an absolute chaos. For my part, I have been content to consider the *Neuroptera* as an order, in the Linnean sense, divisible into three great divisions, *pseudo-Neuroptera*, *Planipennia*, and *Trichoptera*,—but this only as matter of convenience; for I am convinced that contained therein are constituents of several orders, each of equal value with such as *Lepidoptera* and *Coleoptera*, and that the day will arrive when, from an increase of knowledge in embryology and anatomy, the order *Neuroptera*, as constituted by Linné, will be scattered widely—a dismemberment that would have occurred long since, only that there still exists a lingering disinclination to thoroughly upset the Linnean system.

Dr. Packard's arrangement is founded on the idea that in insects, as in all other divisions of the animal kingdom, there are certain groups more elevated, others more "degraded," than the rest. Acting upon this, he places the *Hymenoptera* as structurally and psychically, if I may use the term, superior to all other insects. Then follow *Lepidoptera*, *Diptera*, *Coleoptera*, *Hemiptera*, *Orthoptera*, and, last of all, the *Neuroptera*, in the Linnean sense (but including *Thysanura*), an order which, according to him, "mimics every suborder of insects," being "comprehensive or synthetic types, combining the structure of all the other suborders." I would here particularly call attention to the relative positions occupied by *Lepidoptera* and *Trichoptera*, the latter forming nearly the last division of *Neuroptera*. I emphatically enter my protest against such a wide separation of the two groups, considering, as I do, that, whatever may be the condition of the *Trichoptera* with regard to others of the Linnean groups of *Neuroptera*, their relationship to the *Lepidoptera* is close, and that an attempt to thus widely separate them is an outrage on both. In metamorphosis the resemblance is nearly complete, the fact of the pupal limbs not being enclosed within a common integument not availing much when their condition in certain *micro-Lepidoptera* is taken into consideration: the possession of mandibles by the Trichopterous nymph is not of much importance, inasmuch as these organs bear no relationship to the aborted mandibles of the imago; they simply replace the acid or mechanical means by which a Lepidopterous imago frees itself from its cocoon. The imago in *Lepidoptera* is almost constantly furnished with scales on the wings and body, scales of a peculiar nature, the analogues of which are seen only in *Lepisma*; but many Trichopterous insects have, in the male, a modification of these scales in the form of short inflated hairs, generally intermingled with ordinary hairs; and in some genera this tendency towards a scaly clothing is as marked as is its absence in some *Lepidoptera*. The neural arrangement is not at all incompatible with a close relationship; nor are the parts of the mouth, excepting the absence of a developed haustellum; yet many of the larger *Trichoptera* frequent flowers for the purpose of extracting the nectar; and though I am unable to say by what means this is effected, it seems probable that it is done by prolongation, at will, of the upper portion of the œsophagus into a sort of false haustellum. Perhaps the

strongest mark of demarcation is the presence, in most Lepidopterous imagos, of a spine-like process near the base of the costa of the hind wings, wanting in all *Trichoptera*. That this process is a modification of a vein is almost certain; and I apprehend that, when the homologies of neurulation are better understood, this negative character in *Trichoptera* will not be found of much importance. My own inclination tends strongly towards maintaining *Trichoptera* as a separate order in juxtaposition with *Lepidoptera*; and I am thus content to share the pity bestowed by the reviewer of Huxley's 'Introduction to the Classification of Animals,' in the 'American Naturalist' (a journal receiving Dr. Packard's inspiration) for November 1869, by whom we are told that (p. 545), "the strangest, and, humanely speaking, saddest feature of this classification, is recognizing the Neuropterous family Phryganeidæ as a distinct order (*Trichoptera*)."

In a division of insects such as the Linnean *Neuroptera*, which is so thoroughly heterogeneous, much allowance should be made for differences of opinion, and it is scarcely fair to bestow such dogmatic censure upon any system, however opposed it may be to individual convictions.

### Family PHRYGANEIDÆ.

The following is an attempt at a systematic and synonymic catalogue of all the described species of this family, taken in its limited sense. The genera are not well-defined, notwithstanding the size of the insects, the neural characters not being sufficiently stable, or rather, perhaps, the materials at present in hand being too meagre, to enable me to draw lines of demarcation absolutely satisfactory. A few notes on the general characters are here given.

*Colpomera*, McLachlan, which I was inclined to place as a section of *Phryganea* in its limited sense, on account of the strong facial resemblance of the type to *P. japonica*; is evidently a good genus. The general characters are as in *Phryganea*; but the anterior wings are narrower, the apex being falcate, the apical margin strongly excised. The apex of the abdomen of the female (which sex I have only recently seen) is produced into a telescopic tube, indicating some peculiar mode of life, and quite different from the blunt apex of *Phryganea*. The neurulation differs in the sexes, as in *P. grandis* and allies.



*Phryganea*, Linné (as restricted), has moderately narrow anterior wings, the apex of which is rounded, oblique, or slightly sinuate. In the typical species there is an additional apical cellule in the ♀ in all the wings; but in a section of the genus the neuration is similar in both sexes, or as in the ♂ of the typical species (*Trichostegia*, Hag., Brauer); and in another section the anterior wings have the like neuration in both sexes, but the posterior wings possess an additional fork. The discoidal cell of the anterior wings is elongate in all.

*Holostomis*, Mannh., differs from *Phryganea* in its very broad anterior wings. In the typical species, the neuration of the anterior wings is alike in both sexes (similar to the typical forms of *Phryganea* ♂), but the posterior wings of the ♀ have an additional fork; *H. MacLachlani*, White, has the additional fork in all the wings of the ♀; and on this account I transferred it to *Phryganea*; but, in its form, it is evidently better placed here.

*Neuronia*, Leach, is scarcely to be separated from *Holostomis*: the species are, as a rule, smaller, with the discoidal cell shorter; but possibly the two genera should be united under *Neuronia*, which is the older name. The neuration of the anterior wings is alike in both sexes; but the posterior wings of the ♀ have an additional fork.

*Agrypnia*, Curtis, is distinguished by the narrow, Limnophili-form anterior wings, the neuration alike in both sexes, the spines of the tibiæ and tarsi few in number,—at present one of the best-defined genera.

#### COLPOMERA, *M'Lachlan*.

1. C. SINENSIS, *M'Lach. Trans. Ent. Soc. Lond. ser. 3, vol. i. p. 302.*  
*Hab.* North China.

#### PHRYGANEÆ, *Linné* (restricted).

= *Trichostegia*, Kolenati.

- A. *Alæ anticæ et posticæ fæminis furca apicali addita instructæ*  
(= *Phryganea*, Hag., Brauer).
2. P. JAPONICA, *M'Lach. Trans. Ent. Soc. Lond. ser. 3, vol. v. p. 248.*  
*Hab.* Japan.
3. P. GRANDIS, *Linn. F. S. 379; Hag. Linn. Ent. vol. v. p. 363.*—

*Trichostegia grandis*, Kol. *Gen. et Sp. Trichop.* pt. 1, p. 84.—*P. atomaria*, Steph. *Ill.* vol. vi. p. 206.

*Hab.* Europe.

4. *P. STRIATA*, Linn. *F. S.* 378; Hag. Linn. *Ent.* vol. v. p. 363.—*P. Beckwithii*, Steph. *Ill.* vol. vi. p. 206.—*P. fulvipes*, Burm. *Handb.* vol. ii. p. 934.

*Hab.* Europe.

5. *P. CINEREA*, Walk. *Cat. Brit. Mus. Neurop.* pt. 1, p. 4; Hag. *Neurop. N. Amer.* p. 252.—*P. divulsa*, Walk. *Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 176 (locality erroneous).

*Hab.* North America.

6. *P. VARIA*, Fab. *Ent. Syst.* p. 77; Pict. *Recherch.* p. 160, pl. xi. f. 1.—*Trichostegia varia*, Kol. *Gen. et Sp. Trichop.* pt. 1, p. 86.—*P. annularis*, Oliv. *Encyc.* vol. vi. p. 558.—*P. variegata*, Humm. *Ess.* ii. p. 23.

*Hab.* Europe.

7. *P. SORDIDA*, M'Lach. *post.* p. 106.

*Hab.* Japan.

8. *P. OBSOLETA* (Hagen), M'Lach. *Trans. Ent. Soc. Lond.* ser. 3, vol. v. p. 16.

*Hab.* North and Central Europe.

B. *Alæ posticæ fæminis furca apicali addita instructæ.*

9. *P. VESTITA*, Walk.—*Neuronia vestita*, Walk. *Cat. Brit. Mus. Neurop.* pt. 1, p. 10, ♀.—*P. vestita*, Hag. *Neurop. N. Amer.* p. 253.—*N. commixta*, Walk. *l. c.* ♂.—*P. commixta*, Hag. *l. c.*

*Hab.* United States.

C. *Venæ alarum ant. et post. in utroque sexu ut in mare divisionis* A. (= *Trichostegia*, Hag., Brauer).

10. *P. MINOR*, Curt. *Phil. Mag.* 1834, p. 125; B. E. pl. cxii.—*Trichostegia minor*, Kol. *Gen. et Sp. Trichop.* pt. 1, p. 87.—*P. mixta*, Burm. *Handb.* vol. ii. p. 934.—*P. tortriceana*, Ramb. *Neurop.* p. 471.

*Hab.* North and Central Europe.

### HOLOSTOMIS, Mannerheim.

A. *Venæ alarum ant. et post. ut in divisione* A. *Phryganææ.*

11. H. MACLACHLANI, White, *Trans. Ent. Soc. Lond.* ser. 3, vol. i. Proc. p. 26.—*P. MacLachlani*, M'Lach. *Trans. Ent. Soc. Lond.* ser. 3, vol. v. p. 249, pl. xvii. fig. 1.

*Hab.* North India.

Var. REGINA, mihi (an sp. distincta?).

*Hab.* Japan.

B. *Alæ posticæ fæminis furca apicali addita instructæ; venæ alar. antic. in utroque sexu ut in mare divisionis A. Phryganææ.*

12. H. PHALÆNOIDES, *Linn.*—P. phalænoides, *Linn. F. S.* p. 378.—H. phalænoides, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 82.—P. speciosa, *Lat. H. N.* vol. xiii. p. 86.—P. daurica, *Fisch. Ent. Russ.* p. 52, pl. (Neurop.) ii. f. 1.

*Hab.* North Europe.

13. H. ATRATA, *Lepchn.*—P. atrata, *Lepchn. Iter Sibir.* vol. ii. pl. x. f. 9.—H. atrata, *Hag. Ent. Ann.* 1859, p. 70.—P. altaica, *Fisch. Ent. Russ.* p. 52, pl. (Neurop.) ii. f. 2.

*Hab.* Lapland; Russia; Finland.

14. H. MELALEUCA, *M'Lach. post* p. 106.

*Hab.* Japan.

*Note.*—The variety of *H. Maclachlani*, from Japan, indicated under the name of *regina*, is perhaps a distinct species. I have only seen one female example, lent to me by Baron De Selys Longchamps. It differs from the Indian specimens in the anterior wings being much narrower, elliptical at the apex; the markings of these wings darker, the apical portion of each wing being black, with few yellow irrorations; the costal spots elongate and not divided; the basal portion of the hind wings much darker, blue-black, this colour extending further along the costal margin; the apical band broader; hence the yellow band is narrower, and there are no spots on the costal portion of this band: beneath, the dark portion of these wings is intensely blue-black.

#### NEURONIA, *Leach.*

15. N. PARDALIS, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 7; *Hag. Neurop. N. Amer.* p. 250.

*Hab.* Nova Scotia.

16. N. SEMIFASCIATA, *Say.*—P. semifasciata, *Say, West. Quart. Rep.* ii. p. 161; *Amer. Ent.* vol. ii. p. 97, pl. xlv.—N. semifasciata, *Hag. Neurop. N. Amer.* p. 250.—N. fusca, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 9.—*Ptilostomis Kovalevskii*, *Kol. Gen. et Sp. Trichop.* pt. 2, p. 198, pl. i. f. 1.

*Hab.* North America.

17. N. POSTICA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 8; *Hag. Neurop. N. Amer.* p. 251.

*Hab.* North America.

18. *N. OCELLIFERA*, Walk. Cat. Brit. Mus. Neurop. pt. 1, p. 8; Hag. Neurop. N. Amer. p. 252.  
*Hab.* North America.

19. *N. CONCATENATA*, Walk. Cat. Brit. Mus. Neurop. pt. 1, p. 8.—*N. irrorata*, Hag. Neurop. N. Amer. p. 249 (*nec Fab.*).  
*Hab.* North America.

20. *N. LAPPONICA*, Hag.—*P. reticulata*, var., Zett. Ins. Lapp. col. 1061 (*nec Linn.*).  
*Hab.* Lapland; Island of Oesel.

21. *N. RETICULATA*, Linn.—*P. reticulata*, Linn. F. S. p. 378.—*Oligostomis reticulata*, Kol. Gen. et Sp. Trichop. pt. 1, p. 81, pt. 2, pl. v. f. 57.—*N. reticulata*, Brauer, N. A. p. 44.  
*Hab.* North and Central Europe.

22. *N. CLATHRATA*, Kol.—*O. clathrata*, Kol. Gen. et Sp. Trichop. pt. 1, p. 82.—*H. clathrata*, Hag. Ent. Ann. 1859, p. 69.  
*Hab.* North and Central Europe.

23. *N. OCELLIGERA*, Walk. Cat. Brit. Mus. Neurop. pt. 1, p. 8; Hag. Neurop. N. Amer. p. 259.  
*Hab.* Nova Scotia.

24. *N. STALII*, M<sup>c</sup>Lach. Trans. Ent. Soc. Lond. 1868, p. 289.  
*Hab.* Sweden.

25. *N. RUFICRUS*, Scop.—*P. ruficrus*, Scop. Ent. Carn. p. 690.—*N. ruficrus*, Brauer, N. A. p. 68.—*N. fusca*, Steph. Ill. M. vi. p. 234, pl. xxxiv. f. 2.—*P. striata*, Burm. Handb. vol. ii. p. 935.—*Oligotricha chloroneura*, Ramb. Névropt. p. 473.—*Anabolia analis*, Kol. Gen. et Sp. Trichop. pt. 1, p. 80.  
*Hab.* Europe.

*Note.*—Walker's three species, *N. fusca*, *postica*, and *ocellifera*, are doubtfully distinct according to the types; the names are here used in accordance with the sense in which Hagen has applied them in his 'Neurop. N. America.'

*N. concatenata* is very closely allied to *N. lapponica*; *N. ocelligera* to *N. clathrata* and *N. reticulata*.

#### AGRYPNIA, Curtis.

26. *A. PICTA*, Kol. Gen. et Sp. Trichop. pt. 1. p. 79.  
*Hab.* North Europe.

27. *A. PAGETANA*, Curt. B. E. pl. dxi.—*P. ægrota*, Burm. Handb. vol. ii. p. 935.—*Oligotricha strigosa*, Ramb. Névropt. p. 473.  
*Hab.* North and Central Europe.

*Note.*—Two as yet undescribed species of *Agrypnia* in Hagen's LINN. JOURN.—ZOOLOGY, VOL. XI.



collection are noticed by name only, viz. *A. glacialis*, Hag., from North America, and *A. islandica*, Hag., from Iceland.

### PHRYGANEÆ, *Linné*.

PHRYGANEÆ SORDIDA, nov. sp. *P. variæ* affinis, sed alis anticis latioribus, fusco-griseis fusco plus nebulosis; alæ posticæ ad apicem anguste fusco-limbatae (♀).

Long. corp.  $7\frac{1}{2}$  lin. (=15 mill.); exp. alar.  $18\frac{1}{2}$  lin. (=39 mill.).

*Hab.* Japonia (in *Mus. auct.*).

Evidently allied to *P. varia*, and perhaps scarcely more than a form of that species. The insect, however, is more robust and rather larger; the anterior wings broader, more clouded with fuscous, especially in the basal half, which is almost entirely fuscous; the ground-colour brownish grey, instead of the whitish grey of *varia*; the hind wings with a narrow, smoky-fuscous, apical margin. The anal parts are similar to those of *varia*, only that the lateral lobes seem to be larger and more quadrate.

I have one female example, from Hakodadi.

### HOLOSTOMIS, *Mannerheim*.

HOLOSTOMIS MELALEUCA, n. sp. *H. atra*, nitida. Pedes abdomen-que sordide nigri. Alæ anticæ pallide stramineæ, punctis nigris sat dense conspersæ; posticæ albæ, maculis duabus costalibus ante apicem ornatae, late fusco-limbatae (♂). Long. corp.  $7\frac{1}{2}$  lin. (=15 mill.); exp. alar. 24 lin. (=50 mill.).

*Hab.* Japonia (in *Mus. Brit.*).

*Head and thorax* deep shining black (antennæ broken): palpi and legs dull black with a greyish tinge. *Abdomen* dull black: a long triangular superior median lobe, shining black, directed strongly downwards, notched at the acuminate apex, and bearing, before the apex, a needle-shaped process on either side: penis long, flattened, awl-shaped, testaceous (there are also two small testaceous processes which apparently belong to the app. sup.).

*Anterior wings* very pale straw-colour, rather densely irrorated with small black spots, some of which are confluent and form reticulations; two larger costal spots near the apex, some larger spots towards the inner margin; the apical margin regularly spotted; veins pale, except where they traverse the black markings. *Posterior wings* white, subopaque; a large wedge-shaped black spot on the costal margin above the discoidal cell, the point nearly reaching it; beyond this, nearly at the apex, a second large, irregular, black spot; one or two small black dots near the middle of the costa; apex and apical margin broadly fuscous, with a semilunate pale straw-coloured mark on the extreme margin in each apical cellule; veins pale.

There is one ♂ example in the British Museum, from Hakodadi. The species is evidently allied to *H. atrata*, Lepchn. (*altaica*, Fischer), but differs in its black legs, and in the complete, broad, fuscous margin of the hind wings.

### Fam. LIMNOPHILIDÆ.

#### GRAMMATAULIUS, *Kolenati*.

GRAMMATAULIUS BREVILINEA, n. sp. *G. fusco-niger*, subtus griseo-ochraceus; capite, prothorace, mesothoraceque in medio lurido-rufis. Pedes griseo-flavi; tibiis tarsisque nigro-spinosis. Alæ anticæ angustatæ, elongatæ, ad apicem vix dilatatæ; margine apicali obliquo, paullo exciso; testaceæ, rufo-brunneo nebulosæ, pterostigmate, area suturali cellulaque apicali tertia fuscis, lineis duabus brevibus in area interclavali nigris; posticæ albidæ, hyalinæ, ad apicem flavescences; cellula apicali tertia pallide fuscescente (♀). Long. corp. 8 lin. (= 16 mill.); exp. alar. 20 lin. (= 43 mill.).

*Hab.* Japonia (*in Mus. auct.*).

*Head* above lurid reddish, suffused with fuscous in the middle, quite flat, triangularly produced in front, truncate behind; face and palpi testaceous; eyes black, reticulated with grey, *Pronotum* large, transversely quadrangular, divided in the middle by a longitudinal line, reddish. *Mesonotum* broadly black at the sides, and with a broad longitudinal reddish middle band. *Metanotum* black, somewhat piceous. The whole under-surface of the body greyish ochreous. *Legs* greyish yellow, tibiæ and tarsi with numerous black spines, anterior femora sometimes fuscescent internally. *Abdomen* fuscous above, greyish ochreous beneath: in the female are two long, cylindrical, testaceous, divergent, finger-shaped appendices; beneath these a short, broad, up-directed plate, which is deeply excised at the apex, and two large, oval, obtuse, lateral valves (or inferior appendices). (Pl. II. fig. 1.)

*Anterior wings* long and narrow, the costal inner margins nearly parallel, the apex slightly dilated, the apical margin oblique, excised at the sixth apical cell: colour dull testaceous, suffused with pale reddish brown, the apical portion with paler irrorations; pterostigma fuscous, third apical cell fuscous with some pale dots, sutural area fuscous, but leaving the extreme inner margin pale; area interclavalis with two short longitudinal black lines; veins testaceous. *Posterior wings* broad, subhyaline, the apex and pterostigmatal region yellowish; third apical cellule suffused with pale fuscous; radius crossing the first apical sector at its extremity, forming a fork. (The neuration in each of my two examples is irregular: in one the third apical sector in both anterior wings, and in the right posterior wing, is furcate at its extre-

mity; in the other this sector divides from, or soon after, its commencement, and joins again before the extremity in all the wings, forming a long loop).

I have two females from Japan. It is a true *Grammataulius*, and a very strongly marked species.

### STENOPHYLAX, *Kolenati*.

**STENOPHYLAX GENTILIS**, nov. sp. *S.* pallide testaceus. Antennæ pedesque testacei; tibiis tarsisque nigro-spinosis. Abdomen supra nigro-terminatum; appendicibus superioribus parvis, brevibus, fimbriatis, flavis; app. inf. sursum directis, fimbriatis, flavis, ad apicem nigro-truncatis, dentatis. Alæ anticæ elongatæ, gradatim dilatatæ, pallide flavæ, immaculatæ, subnitidæ; venis flavis; anastomosibus fuscis; margine apicali anguste obscuriore; posticæ pallidiores (♂).

Long. corp.  $5\frac{1}{2}$  lin. (= 11 mill.); exp. alar. 17 lin. (= 36 mill.).

*Hab.* America boreali (*in Mus. auct.*).

The whole body, including antennæ, palpi, and legs, testaceous; tibiæ and tarsi with black spines; eyes black. The last dorsal segment of the abdomen is conically produced at its apex, which is black and scabrous; app. sup. small, rounded, concave internally, yellow, and fringed with yellow hairs; app. intermed. black, truncate (?); app. inf. directed upwards, yellow, fringed externally with long yellow hairs, the apex black and truncate, furnished with small teeth.

*Anterior wings* elongate, broad, the apex parabolic, nearly uniformly pale yellow, almost nude, and shining, the membrane finely rugulose; inner margin (area suturalis) deeper yellow; apical margin narrowly obscure; veins yellow, the anastomoses fuscous; a whitish dot at the thyridium, and another at the arculus. *Posterior wings* hyaline, tinged with yellow; anterior margin deeper yellow.

I have one male, from the White Mountains of New Hampshire, sent by Mr. H. Edwards, of San Francisco. The species is allied to the European *S. hieroglyphicus*, *striatus*, &c., in which the wings are elongate, and the first apical cell in the anterior pair scarcely longer than the succeeding cells.

**S. LIMBATUS**, nov. sp. *S.* rufo-testaceus. Antennæ testacæ, fuscingulatæ. Pedes flavi. Abdomen supra fuscum, infra ochraceum; segmento ultimo lateraliter productum; app. sup. parvis, subquadratis, flavo-fimbriatis; app. inf. sursum directis, ad apicem truncatis, extus fimbriis longis instructis; app. intermed. elongatis, spiniformibus, rectis, ad apicem abrupte uncinatis. Alæ anticæ breves, latæ, ad apicem valde obtusæ, testacæ; nebula in cellula thyridii (puncto albo ad thyridium incluso) maculis duabus (una ad basin cellulæ apicalis

secundæ, altera quartæ) limboque apicali intus dentato pallide brunneis: posticæ hyalinæ (♂).

Long. corp.  $4\frac{1}{2}$  lin. (=9 mill.); exp. alar.  $12\frac{1}{2}$  lin. (=26 mill.).

Hab. Terra Nova (in *Mus. auct.*).

*Head* and *thorax* reddish testaceous, with sparse reddish hairs; antennæ testaceous, with fuscous rings; palpi yellowish; eyes black. *Legs* yellow, tibiæ and tarsi with short black spines, a black point on each trochanter internally. *Abdomen* fuscous above, ochreous beneath; margin of last dorsal segment regularly concave in front, produced at the sides into a triangular tooth, the upper edge of which is excised and beset with numerous very short black spiny hairs; app. sup. small, yellow, subquadrate, truncate, fringed with yellow hairs; app. intermed. long, in the form of two closely applied straight spines, the tips of which are suddenly curved downwards; app. inf. directed upwards, projecting beyond the lateral production of the segment, yellow, truncate at the apex, and fringed externally with long yellow hairs.

*Anterior wings* short and broad, much dilated at the apex; the apical margin oblique, pale testaceous, the membrane finely rugulose, nearly nude, and shining; a cloud in the cellula thyridii extending also above it, and there enclosing a white dot at the thyridium; two irregular spots, one placed at the base of the second, the other in a similar position in the fourth, apical cells, and a broad apical margin which is dentate internally (being produced into an acute triangle along each apical cell) pale brown; ramus clavalis margined beneath with brown; veins testaceous, with short concolorous hairs; first apical cell longer than the second, but not inordinately so. *Posterior wings* hyaline, whitish, slightly yellowish at the apex; veins pale yellowish; fifth apical cell scarcely reaching the anastomosis. (Pl. II. fig. 2.)

I have two males, taken at St. John's, Newfoundland, by Mr. G. F. Mathew. In the form of the wings the species approaches *S. dubius*, *punctatissimus*, &c.; but the first apical cell in the anterior wing is much shorter than in those species.

#### PLATYPHYLAX, nov. gen.

Characteres ut in *Stenophylaci* (sensu stricto), sed calcarium formula 1, 2, 2.

Agreeing in almost every respect with the typical forms of *Stenophylax* (e. g. *hieroglyphicus*, *striatus*, &c.), but with only 1, 2, 2 spurs instead of 1, 3, 4.

I form this genus for the reception of some insects that have been placed in *Enœcylla* on account of their spur-formula being identical (*i. e.* so far as the winged male of *Enœcylla* is concerned), but which are evidently very closely allied to *Stenophylax* and



should be placed next thereto. I have already (Stettiner entomologische Zeitung, 1867, p. 54) separated certain forms with the same number of spurs into a distinct genus under the term *Potamorites*; but these, in the narrower form, and pouched hind wings of the male, come near *Drusus*. *Platyphylax* is really so near *Stenophylax* that, without examining the spurs, the species might pardonably be supposed to pertain to the latter.

In *Platyphylax* should be placed the European *E. Frauenfeldii*, Brauer and *E. Kolenatii*, Kol. (= *Frauenfeldii* ♂?), the North-American *E. subfasciata*, Say, *E. designata*, Walker, and *E. lepida*, Hagen, and the Chinese species described below as *P. lanuginosus*.

*E. irrorata*, F. (= *intercisa*, Walk., Hag.), and *E. præterita*, Walk., probably form another genus. *E. areolata*, Walk., is probably a true *Enæcylla*; but it is desirable to see the female.

*PLATYPHYLAX LANUGINOSUS*, nov. sp. *P. fuscus*, abdomine ochraceo.

Antennæ palpique fusco-nigri. Pedes flavi, tibiis tarsisque fusco-nigris. Alæ anticæ latæ, testaceo-fuliginosæ, dense et breviter testaceo-hirsutæ; venæ pilis erectis fuscis fimbriatæ: posticæ fuliginoso-subhyalinæ, margine costali apicem versus flavido (♀).

Long. corp. 7 lin. (= 15 mill.); exp. alar. 18 lin. (= 37 mill.).

*Hab.* Shanghai (in *Mus. auct.*).

*Head* fuscous above, posterior margin and a small tubercle on each side close to the eyes testaceous; ocelli white; antennæ blackish, the basal joint with blackish hairs, a few testaceous ones being intermingled; face ochraceous; palpi blackish. *Thorax* fuscous above, ochraceous beneath; posterior half of metanotum yellowish. *Legs*: coxæ, trochanters, and femora testaceous; tibiæ and tarsi fuscous, armed with numerous short blackish spines. *Abdomen* ochraceous; at the apex are two short and obtuse appendices (my individual carries at the extremity of its abdomen a dried mass of gelatinous matter, such as envelopes the eggs).

*Anterior wings* broad, the apical margin oblique, somewhat sinuate, and narrowly darker; the colour is smoky with a testaceous tinge; and there is a uniformly dense, almost woolly clothing of short procumbent testaceous hairs, intermingled with which are short, erect, blackish hairs; and on the veins, especially on the cubitus, are longer, erect, blackish hairs; a white dot at the thyridium, and another at the arculus; veins pale fuscous; first to fourth apical cells all more or less truncate at the base, fifth acute, scarcely reaching the anastomosis, furnished with a short footstalk; a black horny dot at the base of the third apical cell. *Posterior wings* smoky subhyaline; veins blackish-fuscous; apical portion of costal margin, and the subcosta and radius at that portion yellowish.

I have one female, from Shanghai, taken by Mr. W. B. Pryer.

## NEOPHYLAX, gen. nov.

Calcaria 1, 2, 4. Alæ anticæ dense pubescentes, apicem versus gradatim dilatatæ, margine apicali sinuato; cellula discoidali elongata; posticæ cellulis apicalibus 5 instructæ. Abdomen infra apicem versus dentibus duobus instructum (♂).

*Head.* Antennæ about the length of the wings, moderately short, the basal joint longer than the head. *Eyes* large. *Ocelli* present. *Maxillary palpi* with short and oval basal joint; second joint long, gradually thickened; third joint rather shorter than the second, cylindrical: labial palpi with two short and thick basal joints, and a longer, slender, and cylindrical terminal joint. *Thorax* short. *Abdomen* slender: penultimate and antepenultimate segments each furnished with a tooth beneath: appendices little prominent. *Legs* moderately long; tibiæ and tarsi with few spines: spurs 1, 2, 4; the inner subapical spur on the posterior tibiæ very small, scarcely more than a tooth-like tubercle; the other pairs subequal.

*Anterior wings* clothed with dense short pubescence, and with short fringes; narrow at the base, gradually widened to the apex; apical margin oblique, slightly emarginate in the middle of the margin of the fourth apical cell, elevated at the point of termination of upper branch of the fork of the ramus thyrifer, and afterwards gradually emarginate to the anal angle, which is rounded; discoidal cell very long and narrow, closed; apical cells long and narrow, the first, third, and fifth acute, or subacute, at the base, and longer than the second and fourth; radius strongly bent before its termination. *Posterior wings* broad, the fringes long at the anal angle; subcosta and radius running very close together for more than half their length, then becoming confluent, or nearly so, afterwards disuniting, the radius then curved; ramus subdiscoidalis simple; hence there are only five apical cells (three apical and two subapical, according to the nomenclature of Kolenati); discoidal cell broad, closed (♂).

A singular genus, which should probably be placed near *Apatania*, with which it agrees in its spur-formula and densely pubescent anterior wings. The shape of the anterior wings is peculiar, and the neuration of the posterior wings very remarkable in the small number of apical cells, in this respect unique in the family Limnophilidæ.

NEOPHYLAX CONCINNUS, nov. sp. *N.* testaceus. Pedes nigro-spinosi. Alæ anticæ fulvæ, fusco-pubescentes, punctis albidis obsoletis irroratæ; margo dorsalis maculis tribus flavis ornatus; ciliis apicalibus fuscis, albido-interruptis; posticæ fumato-subhyalinæ.

Long. corp.  $3\frac{1}{2}$  lin. (= 7 mill.); exp. alar.  $9\frac{1}{2}$  lin. (= 20 mill.).

*Hab.* America boreali (*in Mus. auct.*).

*Head* (with the antennæ, palpi) and *thorax* testaceous; occiput, basal joint of antennæ, and prothorax clothed with testaceous, with an admixture of fuscous, hairs; and there is a fringe of similar hairs on the facial margin of the eye-sockets; eyes dark coppery. *Legs* testaceous, the posterior tibiæ paler; tibiæ and tarsi with few, short, black spines; spurs reddish-testaceous. *Abdomen* pale whitish testaceous; on the antepenultimate ventral segments is a very small, reddish-testaceous, triangular tooth, and on the penultimate segment a much larger tooth; appendices testaceous; app. sup. small, rounded, and ear-shaped, extending little beyond the cavity of the last segment; app. intermed. placed close together, proceeding from under the middle of the upper margin of the segment, nearly straight, and flattened laterally; when viewed from the side each appendage is seen to be dilated at the base, then with the upper margin excised to the apex, which is obtuse; app. inf. inserted close together on the ventral margin, band-like, curved strongly inwards, forming a deep incision when viewed from beneath, the apex obtuse.

*Anterior wings* fulvous, thickly clothed with short, procumbent, fuscous pubescence, the apical half irrorated with many small and indistinct whitish dots; inner margin with three yellow spots, viz. an elongate one at the base, a long triangular one about the middle, and a small one before the anal angle; the pubescence in the spaces between these spots is darker, almost blackish fuscous; apical fringe alternately fuscous and whitish; veins testaceous, the costal margin at the base, and the basal portion of the radius, ciliated with fuscous. *Posterior wings* subhyaline, slightly smoky; the fringes at the anal angle very long, silky, and whitish. (Pl. II. fig. 3, details.)

I received one male example from Mr. J. Angus, of the State of New York.

### Fam. SERICOSTOMATIDÆ.

#### NOTIDOBIA, *Stephens*.

*NOTIDOBIA GRISEOLA*, nov. sp. *N. nigro-fusca*. Caput prothoraxque cinereo-hirsuta: antennæ palpique fuscæ. Pedes flavescentes, antici omnino, femoribusque intermediis posterioribusque interdum fuscis. Abdomen fuscum, cinereo-hirsutum, linea utrinque pallida: appendices inferiores ♂ magnæ, truncatæ, supra in dentem uncinatum incurvatum intus productæ. Alæ anticæ griseæ, dense cinereo-pubescentes: posticæ pallidiores (♂, ♀).

Long. corp. ♂  $2\frac{1}{2}$  lin. (=6 mill.), ♀  $2\frac{3}{4}$ –4 lin. (=6 $\frac{1}{2}$ –8 $\frac{1}{2}$  mill.); exp. alar. 9–12 $\frac{1}{2}$  lin. (=19–26 $\frac{1}{2}$  mill.).

*Hab.* California (*in Mus. auct.*).

Blackish fuscous. *Head* and *prothorax* clothed with whitish ashy-grey hairs, changing to fuscous on the face; antennæ fuscous, paler and

somewhat yellowish in some individuals; palpi fuscous, the maxillary pair in the ♂ very small and applied against the face; hinder margins of meso- and metanota yellowish. *Legs* yellowish; the anterior pair altogether fuscous, which colour sometimes pervades also the intermediate and posterior femora; coxæ blackish-fuscous. *Abdomen* fuscous, sometimes yellowish, with a pale line along each side, and clothed with ashy-grey hairs: appendices of ♂ yellow; app. inf. large, longer than broad, the apex truncate, the superior edge rounded, the apical margin furnished with an acute claw-shaped spine, which is turned inwards, these appendices fringed with yellowish-grey hairs; penis slender obtuse, straight, notched at the apex above. In the ♀ the abdomen is depressed, and at the apex is a large oval pouch, which is usually filled by a dark olive-green mass of eggs; but when empty the upper portion is seen to be furnished with a broad median lobe, on each side of which is a somewhat triangular valve.

*Anterior wings* grey, densely clothed with ashy-grey pubescence, mingled with fuscous; in the ♂ there are two or three small elongate spaces of white pubescence on the inner margin, and an indication of whitish dots in the discal and apical portion of the wing; fringes grey. *Posterior wings* paler grey, with long grey fringes at the anal margin. (Pl. II. fig. 4, details.)

I possess two males and five females, from California, sent by Mr. Henry Edwards; the females vary very much in size and comparative robustness, the larger individuals having the legs and antennæ darker; but all seem to pertain to one species. It is a true *Notidobia*, as is the following species, and in structure is quite identical with the typical *N. ciliaris* of Europe.

**NOTIDOBIA NIGRICULA**, nov. sp. *N. nigra*. Caput thoraxque aureo-hirsuta; antennæ palpique fuscæ. Pedes flavo-fuscescentes, anteriores obscuriores. Abdomen fusco-nigrum, nigro-hirsutum: appendices inferiores magnæ, latæ, excisæ, supra in dentem incurvatum intus productæ. Alæ fuliginosæ, sparse brunneo-pubescentes: anticum pterostigma flavum (♂).

Long. corp. 3 lin. (=  $6\frac{1}{2}$  mill.); exp. alar.  $9\frac{1}{2}$  lin. (= 20 mill.).

*Hab.* California (*in Mus. auct.*).

Dull black. *Head* and *prothorax* above clothed with golden-yellow hairs; on the face the hairs are mostly blackish; antennæ fuscous; palpi fuscous, clothed with fuscous hairs, the maxillary pair small, curved upwards, and closely applied against the face; eyes brown, somewhat coppery. *Hinder margin* of the meso- and metanota yellowish and shining. *Legs* obscure yellowish, with fuscous pubescence; all the coxæ blackish, and the anterior femora, tibiæ, and tarsi dark fuscous; spurs yellow, the pair on the anterior tibiæ fuscous.



*Abdomen* blackish fuscous, clearer beneath, clothed with black hairs: last segment above fringed with long, blackish, curved hairs: inferior appendices very large, longer than broad, yellow, concave internally, the superior margin rounded, apical margin deeply excised, superior angle produced into an incurvated tooth turned inwards, these appendices clothed externally and fringed with long blackish hairs; penis subobtus, the point visible below the app. inf. (Pl. II. fig. 5.)

*Anterior and posterior wings* uniformly fuliginous, subdiaphanous, clothed, but not densely, with short brownish pubescence, which becomes somewhat golden on the costal margin of the anterior wings; and in these wings the pterostigma is indicated by a narrow yellow space; fringes brownish-grey, becoming pale grey towards the anal angle of the posterior; veins fuscous.

I have one male, from California, sent by Mr. Henry Edwards. It differs from *N. griseola* by the uniform smoky colour of the wings, and in the form of the appendices.

#### NOSOPUS, gen. nov.

*Calcaria* 1, 4, 4. *Antennarum articulus basalis* elongatus, hirsutus. *Palpi maxillares* parvi, ad frontem arcte applicati: *labiales* valde elongati, compresso-dilatati, squamati; *articulo basali* parvo, 2° elongato, dilatato, 3° ad apicem acuminato. *Pedes antici* tibia brevissima *calcarea* singulo uncinato instructa, *tarsorum articulus basalis* valde dilatatus, intus sulcatus, infra dense cerato-squamatus: *intermedii posticique* graciles. *Alæ anticæ* ovales, hirsutæ; *cellula discoidali* oclusa, angustata, *cellula thyridii* perelongata; *cellulis septem apicalibus*: *posticæ* in medio dilatatæ; *cellula discoidali parva*, oclusa (♂).

*Head* densely clothed with long hairs; *antennæ* not so long as the wings, moderately stout, the apical half subserrate internally, basal joint nearly twice the length of the head, strong, hirsute, the succeeding joints short and transverse; eyes small and round; *maxillary palpi* very small, somewhat clavate, directed upwards and lying closely applied against the face, clothed externally with long and strong hairs; *labial palpi* very large and long, densely clothed with scales, the basal joint short, second very long, compressed and dilated, third about as long as the second, and equally broad at the base, but gradually acuminate to the apex. *Legs*: anterior pair abnormally constructed as follows:—the coxa elongate, and ordinary; the trochanter small and cup-shaped; femur long, moderately slender, gradually diminishing from base to apex; tibia very short, sub-

ovate, truncate, and dilated, slightly scaly, armed with one stout, claw-shaped spur; first joint of tarsi enormously dilated, twice the length of the tibia, sulcate internally, the lower surface densely furnished with waxy-looking scales; succeeding tarsal joints short and small, gradually diminishing in length and thickness; intermediate and posterior legs slender, and of the ordinary form, each tibia furnished with an apical and subapical pair of long and equal spurs. *Abdomen* short and somewhat stout; inferior appendices short, curved.

*Anterior wings* oval, rather densely clothed with short hairs, the fringes somewhat long; subcosta and radius nearly straight, parallel; discoidal cell narrow, closed by a straight veinlet; cellula thyridii very long, extending nearly to the base, and reaching to the middle of the discoidal cell, closed by a straight veinlet; a veinlet unites the lower fork of the ramus discoidalis with the ramus thyriifer, placed level with that closing the discoidal cell; an oblique veinlet beneath the middle of the cellula thyridii unites this with the cubitus anticus; seven apical cellules, the first extending along one-third of the upper edge of the discoidal cell, third shorter than the first, but longer than the second, fourth equal to the second, fifth longer than the first, extending to a level with the middle of the discoidal cell. *Posterior wings* moderately long, gradually dilated to beyond the middle, apex parabolic, costal margin with a short inturned fringe, anal portion with very long fringes; subcosta and radius united for some distance, afterwards separating and diverging; discoidal cell small, subtriangular, closed by a straight veinlet; a second veinlet unites the lower edge of the discoidal cell to the ramus subdiscoidalis; lower branch of the ramus discoidalis simple; ramus subdiscoidalis simply and longly furcate.

A genus abundantly distinct by the enormous labial palpi, and very abnormal structure of the anterior legs, the aborted tibia and enormous first tarsal joint in these legs being very remarkable; the mass of scales on the surface of this strange tarsal joint has, at first sight, the appearance of a waxy secretion, but resolves itself into waxy-looking scales under a high power. The genus is evidently a near ally of *Mormonia*; and nature would seem to have selected this group as one in which she can best display her wealth of forms. In this group is also exhibited a more or less constant tendency to substitute a scale-like clothing for hairs in the male sex. In the typical species of *Mormonia* (*M. hirta*) this clothing pervades almost the entire insect; in *Nosopus* it is concentrated, so to speak, upon the labial palpi and the abnormal tarsal joint. It is possible, nay, almost certain,

that the female will be found to have ordinary palpi, and the usual slender anterior legs; and, in all probability, 2, 4, 4 spurs; for one spur may be reasonably supposed to be aborted in the anterior male tibiæ.

*NOSOPUS* *PODAGER*, nov. sp. *N. fuscus*. Caput griseo-hirsutum. Antennæ flavidæ, fusco-annulatæ, articulo basali supra griseo, infra nigro-hirsuto. Palpi maxillares nigro-hirsuti; labiales rufo-squamati. Pedes antici rufo-fusci, tarsorum articulo 1° infra rufo-squamato: intermedii posticique testacei. Abdomen fuscum. Alæ griseo-fuscae, subhyalinæ, griseo-hirsutæ: anticæ ad costam marginisque interioris basin breviter nigro-fimbriatæ (♂).

Long. corp. 3 lin. (=6 mill.); exp. alar. 9 lin. (=19 mill.).

*Hab.* California (*in Mus. auct.*).

Dark fuscous. *Head* above, and basal joint of antennæ, clothed with grey hairs, face and maxillary palpi with black hairs; antennæ (except the basal joint) yellowish, with narrow fuscous rings; labial palpi densely clothed with reddish scales. Anterior *legs* reddish fuscous, the lower and outer side of the first tarsal joint with dense waxy-looking reddish scales; intermediate and posterior legs testaceous, the coxæ fuscous. *Abdomen* fuscous, the margins of the segments greyish: from beneath the upper margin of the last dorsal segment proceeds a short, broad lobe, which ends in two updirected triangular pointed branches; app. inf. short, band-like, curved inwards, the apex toothed.

*Wings* greyish-fuscous, sparingly clothed with dark grey hairs: in the anterior wings the pterostigmatal region with denser hairs; apical fringes grey; costal margin, and inner margin at the base, with short blackish fringes: posterior wings with grey fringes, becoming blackish at the base of the costa: veins pale grey in all the wings. (Pl. II. fig. 6, details.)

I have one male, sent by Mr. H. Edwards.

#### *DINARTHURUM*, gen. nov.

*Calcaria* 2, 4, 4. Antennarum articulus basalis rectus, longissimus, corporis longitudini æqualis, irregulariter compressus, utrinque fimbriis longis, necnon ad basin spina robusta instructus; articuli cæteri breves, graciles, basalis semel sumpti longitudinem haud superantes. Palpi maxillares elongati, porrecti, plumosi, 2-articulati; articulo 1° modice robusto, 2° gracili, curvato: labiales pergraciles, elongati; articulo 1° brevissimo, 2° elongato recto, 3° 2° æquali, curvato. Pedes graciles. Alæ anticæ ovales, squamatæ hirsutæque, sulco longitudinali elongato angustato mediano instructæ; mar-

gine costali intus fimbriato, margine apicali fimbriis longis instructo; cellula discoidali oclusa, venis irregularibus (♂).

*Head* very small: eyes small and round: first joint of the antennæ extraordinarily long, equal to, or exceeding, the length of the whole body, standing out straight from the head, strong, compressed, but irregular in its breadth, arising from a prominence on the head, furnished internally at the base with a strong curved spine, which is widened and truncate at the apex, the basal portion clothed with stout hairs, afterwards fringed with two rows of very long slender hairs; the rest of the antennæ not exceeding the length of this first joint, articulated to it almost at a right angle, strongly curved, composed of numerous short and slender joints: maxillary palpi apparently 2-jointed (or there is perhaps a short, but invisible, basal joint), long, extending far beyond the head; first joint long, porrect, band-like, almost geniculate at the base, afterwards bent, strongly plumose and scaly; second joint equalling the first in length, but slender and curved: labial palpi very slender; first joint very short, scarcely visible; second joint long, cylindrical, straight; third joint equal to the second, curved. *Thorax* small. *Legs* slender, spurs 2, 4, 4, moderately long and subequal, hairy, those on the anterior tibiæ less equal and more hairy than the others; tarsal joints long and slender. *Abdomen* short; inferior appendices long.

*Anterior wings* oval, scarcely dilated, the upper half thinly clothed with scales intermingled with hairs, the lower half with hairs only: these two divisions are separated by a deep, narrow, longitudinal groove, extending from near the base almost to the apex, containing more closely placed scales; the groove is placed between the ramus thyriifer (which it nearly obliterates) and the ramus clavalis, this latter being very strong and furnished with an updirected fringe of long scale-like hairs, which form a cover over the groove; subcosta and radius straight and subparallel; discoidal cell short, narrow, closed; no apparent cellula thyridii; the neuration in the lower half of the wing (below the groove) irregular, forming five large irregular cells: costal margin with a long inturned fringe in its basal half; apical margin with very long fringe. *Posterior wings* short, scarcely so broad in their widest part (which is beyond the middle) as the anterior, the apex elliptical; hairy and with a few scales on the costal margin; fringes very long: neuration regular; subcosta and radius confluent for the greater part of their length, afterwards separating and divergent, forming a long apical fork; discoidal cell very similar to that in the anterior wings, closed: lower branch of ramus discoidalis simple; ramus subdiscoidalis simply forked, connected with the ramus discoidalis by an oblique veinlet beneath the discoidal cell.

Like the last genus, allied to *Mormonia*, or perhaps more nearly



to *Lasiocephala*, with which it has some affinity in the maxillary palpi; but the extraordinary form of the antennæ is without parallel anywhere in the Trichoptera. In *Nosopus* the anterior legs were the members in the construction of which nature had departed from her usual routine; here the legs present no special characters, but every thing is thrown into the development of the antennæ, with a result which, to say the least, is bizarre. The groove or pouch of the anterior wings is not of so great significance, as modifications of this already exist in many genera, and where such a groove is present, it often, as in the present instance, causes irregularity in the neural arrangement.

The female will probably be found to have ordinary antennæ, and to resemble that of *Mormonia*.

**DINARTHURUM FEROX**, sp. nov. *D. fusco-testaceum*. Antennarum articulus basalis fuscus, fimbria grisea, ad apicem flavescens; articuli cæteri pallide flavi, fusco-cingulati. Palpi flavi, maxillares griseo-hirsuti nigroque squamati. Pedes pallide flavi. Abdomen supra fuscescens, infra ochraceum: appendices inferiores ad apicem longe dentatæ. Alæ pallide griseæ, griseo-fimbriatæ, nigroque squamatæ: anticæ margine costali basin versus sulcoque nigro-fimbriatis (♂).

Long. antenn. artic. primi  $2\frac{3}{4}$  lin. (=6 mill.); long. corp.  $2\frac{3}{4}$  lin. (=6 mill.); exp. alar. 10 lin. (=21 mill.).

*Hab.* in India septentrionali (*in Mus. auct.*).

Fuscous, or yellowish-fuscous, all the under parts of the thorax yellow.

*Head* fuscous above, yellow beneath, clothed with greyish fuscous hairs: basal joint of antennæ fuscous, becoming yellowish towards the apex, the basal portion of the tooth almost black and somewhat shining, fringes dark grey, blackish at the basal portion, and yellowish at the apical; rest of the antennæ pale yellow, with brown rings: maxillary palpi yellow, clothed with long dark grey or blackish hairs, intermingled with a few black scales; labial palpi pale yellow.

*Legs* yellow, with yellow spurs. *Abdomen* somewhat fuscous above, the margins of the segments broadly darker, under surface ochraceous: the margin of the last dorsal segment is produced into a triangular prolongation in the middle; from beneath this prolongation proceeds a yellow, shining, triangular lamina, which is deeply grooved in the centre, the sides sloping obliquely upwards, having the appearance of two valves soldered together; app. sup. yellow, short and broad, subquadrate, proceeding from beneath each side of the prolongation of the last dorsal segment; app. inf. long, yellow, directed upwards, the apex furnished with two long spines or teeth, each of which is as long as the simple basal portion, the appendices are hairy; interiorly, viewed from beneath, between the app. inf. are

seen two small yellow appendices, which are probably the app. intermed.

*Wings* pale grey, with long grey fringes. *Anterior wings* clothed with golden-grey hairs, the upper portion (above the groove) with numerous, slightly attached, black scales; these scales are absent in the lower portion: costal margin with a strong inturned fringe of blackish scale-like hairs at the base, and a fringe of similar hairs on the ramus clavalis closing over the groove; veins yellow, especially those in the lower portion, the apical ones fuscous. *Posterior wings* clothed with grey hairs, and with scattered black scales on the anterior margin; veins fuscous. (Pl. II. fig. 7, details.)

I have two males of this extraordinary creature, which were given to me by Capt. A. M. Lang, R.E., by whom they were captured in North India.

### Fam. LEPTOCERIDÆ.

#### PERISSONEURA, gen. nov.

*Calcaria* 2, 4, 4, pubescentia. Caput transversum, inter oculos excavatum; ocelli desunt: antennæ graciles, articulo basali bulboso: palpi maxillares elongati, hirsuti, articulo basali brevi, cæteris elongatis inter se longitudine fere æqualibus: labiales parvi. Thorax robustus. Pedes graciles. Abdomen robustum. Alæ amplæ, latæ, ad apicem obtusæ, pubescentes; venis robustis: anticarum radio cum sectore apicali 1° juncto, venulis transversalibus in area costali plurimis, quarum una furcata; anastomosis ante medium sita; cellula discoidali elongata, oclusa, ante apicem venula transversa insititia instructa; cellulis apicalibus decem, elongatis: posticæ anticis haud latiores (♀).

*Head* transverse, polished, excavated between the antennæ; no ocelli; eyes moderately prominent; antennæ not longer(?) than the wings, slender, the basal joint bulbous; maxillary palpi long, hairy, ascending, basal joint very short, second and third joints long, equal, cylindrical, stout, fourth and fifth slightly shorter and thinner, the latter obtuse at the apex; labial palpi small, hairy, first joint very short, second and third longer, equal. *Prothorax* small and transverse, hairy. *Mesothorax* robust, convex above, polished. *Legs* slender, pubescent; spurs 2, 4, 4, pubescent; anterior tibiæ with a pair of moderately long and subequal spurs; intermediate and posterior tibiæ each with two pairs of long and subequal spurs. *Abdomen* very stout, long; the apex beneath forms a polished, flattened surface, on which is seen an oval scale on each side of the vulva, and beyond these two acute valves.

*Wings* broad, clothed with moderately dense, short pubescence; the veins very strong and much elevated. *Anterior wings* much dilated at the apex, which is obtuse, the apical margin obliquely rounded, the inner margin very concave; subcosta straight, running into the costal margin; radius parallel with the subcosta, running into the first apical sector near the apex, joined to the subcosta by a short transverse veinlet; costal area with the usual basal veinlet, followed by a broadly furcate veinlet, and after this by 4-5 oblique veinlets, all strong and well marked; first apical sector near its base joined to the radius by a veinlet; discoidal cell long, its apical quarter narrowed after the points of departure of the first apical sector, a transverse veinlet at about the point of departure of this sector, and another beyond, at the point of furcation of the lower branch of the ramus discoidalis; cellula thyridii very long, extending nearly to the base, gradually dilated to the point where it is closed by a transverse veinlet; anastomosis complete, situated before the middle of the wing; apical cells ten in number, very long, the fifth and seventh not reaching the anastomosis, and acute at the base. *Posterior wings* scarcely so broad as the apical portion of the anterior, obtuse, the apical and inner margins gently rounded, costal margin folded narrowly inwards for the greater part of its length; subcosta and radius separated only at the base and apex; discoidal cell shorter than in the anterior, similarly formed, but without the supplementary inner veinlet; forks one, two, three, and five all present; costulae numerous; cubitus furnished with a fringe of strong oblique hairs, which lie close to the membrane beneath it: marginal fringes scarcely present in either pair of wings (♀).

In no other genus am I aware of the existence of the numerous strong costal veinlets here present. It is true that the species of the anomalous family *Æstropsidæ* (*Polymorphanisus* &c.) present an analogous character; but in them these veinlets are ill-developed, and have been aptly termed by Brauer, the founder of the family, "false veinlets." Neither am I aware of the existence of a supplementary veinlet in the discoidal cell in other genera. Although I place the genus in the *Leptoceridæ*, I am by no means sure of its position, which can only be decided by the discovery of the male. In fact, several points of structure rather indicate that its true location would be in the *Sericostomatidæ*, in the vicinity of *Barypenthus* and *Musarna*. The form of the maxillary palpi of the female is not inconsistent with its position in either *Leptoceridæ* or *Sericostomatidæ*.

**PERISSONEURA PARADOXA**, n. sp. *P. atra*, capite thoraceque nigris. Pedes picei, genibus calcaribusque testaceis. Abdomen sor-

dide nigrum; linea utrinque laterali ochracea; segmentis apicalibus ventralibus flavo-marginatis. Alæ fuscae, subnitidae, nigro-pubescentes; venis piceis (♀).

Long. corp.  $7\frac{1}{2}$  lin. (=15 mill.); exp. alar. 22 lin. (=46 mill.).

*Hab.* Japonia (in *Mus. Dom. De Selys*).

*Head* and *thorax* deep shining black; eyes greyish; antennæ blackish; palpi yellowish, clothed with blackish hairs; prothorax above clothed with black hairs, beneath forming a pale yellow space extending between the anterior coxæ, and on each side of these. *Legs* pitchy, the anterior pair paler, somewhat testaceous; the knees and spurs testaceous. *Abdomen* dull black, an ochreous line along each side, and the margins of the terminal ventral segments yellow; terminal portion beneath flattened, smooth and yellow: vulvar scales large, oval, piceous, lying closely applied to the surface; beyond these are two acute triangular yellow valves, the tips blackish and extending somewhat beyond the apex of the abdomen.

*Wings* uniformly fuscous, somewhat shining, clothed with blackish pubescence, which is more dense on the posterior wings and on the costal portion of the anterior; in the anterior pair, beyond the anastomosis, is an appearance of an indistinct whitish discal space; the veins all piceous. (Pl. II. fig. 8, details.)

For the opportunity of examining and describing this curious insect I am indebted to the courtesy of my friend the Baron de Selys Longchamps, the learned monographer of the *Odonata*.

ASCALAPHOMERUS, *Walk.* (Cat. Brit. Neurop. pt. 1, p. 79).

Calcaria 2, 4, 4. Caput: ♂ oculi permagni, supra fere connexi; ♀ oculi parvi, distantes; vertex transversus, cirris instructus: ocelli desunt: palpi maxillares tæniiformes, valde hirsuti, articulo basali brevi, 3° valde elongato, 2°, 4°, et 5° brevioribus; labiales parvi, graciles: antennæ valde elongati, in ♀ breviores, cylindrici, graciles, vel interdum in ♂ gradatim crassiores, articulo basali brevi. Corpus robustum, breve. Pedes graciles. Alæ fere nudæ: anticæ elongatæ, apicem versus dilatatæ, margine apicali obliquo; venæ robustæ, radio cum sectore primo paullo ante apicem conjuncto (et in al. post); cellula discoidali brevi, oclusa; cellula thyridii permagna, ante alæ medium sita; cellulis apicalibus elongatis, angustatis: posticæ elongato-ovales, anticis fere dimidio breviores.

*Head* of the ♂ occupied almost entirely by the eyes, which are very large, and nearly confluent above: that of the ♀ with the eyes small; the vertex transverse, furnished with large tubercles, whence



arise tufts of long hairs: ocelli absent: antennæ very long and slender, but sometimes gradually thickening to the apex; basal joint short, succeeding joints (after the second) long, but those of the apex becoming gradually shorter and almost transverse: maxillary palpi ascending, the joints band-shaped and very hairy; first joint short, third very long, second, fourth, and fifth each shorter than the third, but the second longer than the fourth or fifth: labial palpi very small and slender, the two end joints elongate. *Mesothorax* very robust, long-oval, nude, but with a tubercle near the point of connexion of each anterior wing, whence arise long hairs similar to those on the vertex. *Abdomen* short, very robust in the ♀. *Legs* slender, pilose; spurs 2, 4, 4, the pairs subequal.

*Wings* nearly nude and shining, the veins very conspicuous and strong, alike in both sexes. *Anterior wings* elongate, dilated towards the apex, which is considerably produced; apical margin very oblique; inner margin concave; radius becoming confluent with the first apical sector a little before the apex, but sending a short branch to the costal margin; discoidal cell closed, short, elongately triangular, no veinlet between this cell and the radius; cellula mediana longer than the discoidal, equal to it at its extremity, but extending further inwards at its base; cellula thyridii very broad, commencing near the base, but not extending to the middle of the wing (ending before the commencement of the discoidal cell), hence the sixth to ninth apical cells extend far into the wing; all the apical cells narrow and very long. *Posterior wings* elongately oval, much shorter than the anterior wings, and scarcely broader: radius confluent with the first sector, as in the anterior, and the subcosta also appears to be confluent with the radius at its apex; the cubitus is furnished with a fringe of long hairs towards the base, and the veins of the anal angle are similarly fringed.

The appendices of the male are complicated: the app. sup. rather long, narrow at the base, but gradually dilating into a spoon-shaped club; the app. inf. two-jointed, the apical joint being short and ovate; between the app. sup. are two large blades, nearly uniting in the middle, but with the obtuse points divergent; and between and below these there is the penis, only the apex of which is visible. In the female the extremity of the abdomen is broad, forming a large open pouch with two broad side valves and a median prolongation of the last dorsal segment; the apical ventral segments are narrow and transverse.

The figures on Pl. III. (fig. 9) are taken from *A. finitimus*, M'Lachlan. The original species, *A. humeralis*, Walker, is larger and darker, and, with the appendices somewhat different, though

formed after the same plan. In both, the antennæ of the female are much shorter than those of the male, in *humeralis* remarkably so. In *finitimus* these organs are slender throughout in the ♂, whereas in *humeralis* they are gradually incrassate in the apical portion.

A completely analogous formation of the eyes in both male and female is to be found in the micro-lepidopterous genus *Adela*.

I have diagnosed and described this extraordinary genus anew, because the description given by Mr. Walker is insufficient. It appears to me that, having regard to the homologies of the arrangement of the nervures in Trichoptera, an error has been frequently committed, of which I have myself been guilty in some previous descriptions in former papers. I allude especially to the area or cell which has been called the "cellula thyridii" in the anterior wing. To Kolenati we are indebted for a very lucid explanation of the different veins, areas, and cellules; and in his index wing (Gen. et sp. Trichop. pt. 1, tab. i. f. 1), taken from *Glyphotælius*, the "cellula thyridii" is the area between the two veins which he terms "radii ramus thyrifer," and "radii ramus clavalis," and which I have called (Trichop. Britannica) the "superior and inferior branches of the ramus thyrifer." But in almost all genera of Hydropsychidæ, and in several genera of Leptoceridæ, e. g. *Ascalaphomerus*, *Anisocentropus*, *Ganonema*, *Asotocerus*, *Calamoceras*, *Heteroplectron*, &c., the superior branch of the ramus thyrifer ("radii ramus thyrifer" of Kolenati) furcates near the middle of the wing; and this furcation is generally closed by a transverse veinlet placed nearly on a level with that closing the discoidal cell, and forming a cellule, which has been usually termed the "cellula thyridii," though the true cellula that should be so called, equivalent to that in the Limnophilidæ, &c., lies beneath it, extending to near the base, and usually ending soon after the commencement of the cellule formed by the connected ramules of the superior branch. This latter cellule, then, I propose to call the "*cellula mediana*." A reference to the outline figures of the wings of any of the above-named genera will more fully explain my meaning.

In Mr. Walker's description of the genus *Ascalaphomerus* the words "cell of the thyridium" should then read "median cellule;" and his "interclaval areolet" is in reality the true "cellula thyridii."

#### HETEROPECTRON, gen. nov.

Calcaria 2, 4, 2, ♂; 2, 4, 4, ♀. Maris tibiæ posticæ fimbriis

longis extus instructæ. Antennæ alis paullo longiores, intus sub serratæ. Palpi maxillares longati; articulo 1<sup>o</sup> brevi, 2<sup>o</sup> et 3<sup>o</sup> elongatis, 4<sup>o</sup> et 5<sup>o</sup> brevioribus. Alæ anticæ amplæ, elongato-triangulares: pube brevi dense vestitæ; margine apicali obliquo; venis ♂ ♀ æqualibus; cellula discoidali occlusa, elongata, angustata; cellulis apicalibus novem angustatis, quarum 1<sup>a</sup> ad basin cellulæ discoidalis fere extensa: posticæ breves, latæ; radio cum sectore primo ad apicem conjuncto (♂ ♀).

*Head.* Antennæ stout, tapering to the apex, rather longer than the wings; the basal joint short, subglobose; third and succeeding joints long (the third longer than the others); each, at its apex internally, carries one or two short spines or bristles, causing the antennæ to appear somewhat serrated, but these are absent in the extreme apical portion. Eyes small. Maxillary palpi long, stout, hairy: basal joint short; second very long; third slightly shorter than the second, and thinner; fourth and fifth each about one-third shorter than the third. Labial palpi small: basal joint very short; second long, third still longer than the second. *Prothorax* very small; on each side beneath is a semicircular lobe. *Mesothorax* oval, elongate. *Metathorax* cordate. *Abdomen* short, moderately stout; ♂ superior and inferior appendices present; penis (or upper penis-cover?) long, triangular; ♀, apex of abdomen oblique, forming a shallow cavity beneath. *Legs*: anterior pair short; intermediate and posterior very long; posterior tibiæ of the ♂ fringed externally with very long silky hairs; tarsal joints long; in the ♂ the first two joints have, externally, long bristle-like hairs, which, becoming agglutinated, have the appearance of long spines. Spurs: ♂, 2, 4, 2, the pairs subequal, those on the anterior tibiæ shorter; ♀, 2, 4, 4.

*Wings.* *Anterior wings* ample, elongately triangular, the apical margin oblique; densely clothed with short pubescence; fringes very short: subcosta and radius regular, straight, connected towards the apex by a transverse veinlet; discoidal cell very long and narrow, closed; median cell longer than the discoidal, and broader; cellula thyridii commencing near the base and extending to the middle of the median cell; nine apical cellules, all of which are long, the first extending to two-thirds the length of the discoidal cell, first, third, fifth, seventh, and ninth acute at the base, second, fourth, sixth, and eighth truncate. *Posterior wings* short and broad, the costal margin rounded up to near the apex, the apical portion being slightly excised; apex obtuse; radius becoming confluent with the first apical sector before the apex; neuration otherwise much as in the anterior wings, allowing for the usual differences; the discoidal cell is perhaps open in these wings (the possible position of a trans-

verse veinlet closing it, is marked in the figure by a dotted line; but I could not clearly determine it).

It is an almost invariable rule in Trichoptera that the number of spurs on the posterior tibiæ shall equal, or exceed, that of the intermediate. However, in 1863 (Trans. Ent. Soc. Lond. 3rd series, vol. i. p. 492) I described a genus (*Anisocentropus*) in which the spur-formula was 2, 4, 3, in both sexes, and another (*Nesopsyche*) in 1866 (*l. c.* vol. v. p. 268), with the formula 3, 4, 3. And in *Heteroplectron* we have a still more remarkable case, the formula being 2, 4, 2 for the ♂, though regular (2, 4, 4) for the ♀. The genus is probably allied to *Anisocentropus*, somewhat resembling its general form, but differing (besides in the spurs) by the shorter, stouter, and subserrate antennæ, different proportions of the joints of the palpi, minor characters of neururation, and the long-fringed posterior tibiæ of the ♂. But it has little affinity with any other described genus of Leptoceridæ.

**HETEROPECTRON CALIFORNICUM**, nov. sp. *H. fusco-nigrum*. Caput thoraxque aureo-hirsuta. Antennæ fuscae. Pedes flavi; maris tibiæ posticæ extus fimbriis aureo-griseis longis instructæ. Alæ anticæ fuscae, aureo-pubescentes; venis venulisque fusco-nigris: posticæ fusco-nigræ (♂ ♀).

Long. corp.  $4\frac{1}{2}$ – $5\frac{1}{2}$  lin. (=11–12½ mill.); exp. alar. 14–16 lin. (=29–34 mill.).

*Hab.* California (*in Mus. auct.*).

Blackish fuscous. *Head* clothed with golden hairs, springing from tubercles on the crown; thus there is a rounded tubercle on each side close to the eyes, another in front between the basal joints of the antennæ (these simulate ocelli), and an elongate one on each side on the posterior margin (when the hairs are removed, these tubercles are seen to be paler brown than the ground-colour): antennæ fuscous or black, somewhat yellowish in some ♂ individuals, with obsolete darker annulations; eyes dark coppery; palpi clothed with fuscous hairs. *Prothorax* clothed with golden hairs; and there is a broad line of similarly coloured hairs down the middle of the *mesothorax*. *Legs* testaceous, darker in the ♀; in the ♂ the outer side of the tibiæ is fringed with very long greyish-golden, silky hairs, and the tarsal joints have long spine-like tufts of greyish or fuscous hairs. *Abdomen* blackish; appendices of the ♂ somewhat testaceous; app. sup. elongately triangular, pointed, arising from each side of the middle of the margin of the last dorsal segment, fringed with long golden hairs; app. inf. thick, cylindrical, curved upwards, fuscous at the base, then testaceous, and black at the tips, fringed with long golden hairs; from the interior of the cavity of the last segment



arises the long, triangular, yellow penis (or perhaps it is rather only the penis-cover), the apex of which is somewhat produced and notched, this member is concave beneath, and extends beyond the appendices.

*Anterior wings* varying from dark golden brown to blackish fuscous, uniformly of one tint without markings (the ♀ always the darker), clothed with golden or fuscous pubescence (when the pubescence is removed, the membrane appears to be sprinkled with somewhat numerous, but indistinct, pale dots); fringes fuscous; veins brown, costa, subcosta, and radius darker, because thicker; upper branch of the ramus thyrifer, in that portion of it that forms the upper boundary of the cellula thyridii, whitish, semitransparent. *Posterior wings* smoky blackish, the veins darker; fringes blackish. (Pl. III. fig. 10, details.)

I have examined six males and two females, sent to me by Mr. Henry Edwards, of San Francisco.

GANONEMA, *M'Lachlan* (Tr. Ent. Soc. Lond. ser. 3, vol. v. p. 253).

In this genus should be placed *Hydropsycha vicaria*, Walker, Cat. Brit. Mus. Neurop, pt. 1, p. 114, from Venezuela, the type of which is a single unexpanded example with broken antennæ. I have received a second individual from the same quarter, from which I have drawn up the following description. A second species is also from Venezuela. These do not differ sufficiently in structure from the Malayan *G. pallicorne* to necessitate the formation of a genus for their reception, notwithstanding the wide difference in locality. I still think that the suspicion expressed by me (*l. c.* p. 255), that *Asotocerus* and *Ganonema* may be identical, is well-founded, especially as the neural differences in the fore wings are more apparent than real, inasmuch as the lower branch of the ramus discoidalis is really only simply furcate in *G. pallicorne*, the supposed additional sector belonging to the ramus thyrifer; hence there are the same number of sectors in both genera. The neuration of the hind wings of both the Venezuelan species is like that in *Asotocerus*, both being males; thus it is very probable that the differences are sexual, as I suspected. In the form of the wings the South-American species agree with *Ganonema* \*.

\* A very closely allied genus is *Calamoceras*, Brauer, as would seem to have been since recognized by its describer (Verh. Zool. Bot. Gesell. Wien, 1868, p. 406). I cannot help thinking that the locality, "Gibraltar," given for *C. marsupus*, has arisen from an error in labelling, and that the insect is really exotic.

**GANONEMA VICARIUM.** (*Hydropsyche vicaria*, *Walk. l. c.*) *G. ferrugineum*, mesothoracis lateribus nigricantibus. Antennæ flavæ, nigro-annulatæ, articulis singulatim spina brevi intus ad apicem instructis. Pedes flavi, tibiis tarsisque intermediis extus obscurioribus. Alæ anticæ griseo-fulvæ, nigro-pubescentes et fimbriatæ, maculis aureis plurimis indistincte irroratæ; margine apicali obliquo, paullo rotundato; cellula apicali 1<sup>a</sup> anastomosim attingente: posticæ griseo-subhyalinæ, griseo-fimbriatæ (♂).

Long. corp. 4 lin. (=9 mill.); long. antenn. 15 lin. (=32 mill.); exp. alar. 12-13 lin. (=25-27 mill.).

*Hab.* Venezuela (*Dyson; Göring; in Mus. Brit. et auct.*).

Ferruginous (or reddish-testaceous). *Head* clothed with scattered yellowish hairs upon the vertex, and with a few distant black hairs at the margins of the orbits: antennæ yellow; each joint, after the basal, conspicuously black in its apical half, the apex of each bearing a short black spine internally (in the last third the annulations become indistinct and brownish, and finally disappear): eyes coppery: maxillary palpi yellow, clothed with long black hairs, intermingled with some yellowish ones: labial palpi with yellow hairs. *Mesonotum* bearing a broad black stripe along each side. *Legs* yellow, with yellow pubescence; but the intermediate tibiæ and tarsi are rendered blackish externally owing to the presence of sparse blackish pubescence. *Abdomen* yellowish, the apex obscure: app. sup. long, flattened, somewhat lanceolate, yellowish, the points approximating; app. inf. long, thinner than the app. sup., directed upward, with a tuft of blackish hairs at the tips; between the app. inf. is seen the short, thick, yellow penis (or cover?). (Pl. III. fig. 11.)

*Anterior wings* obliquely rounded at the apical margin; grey or greyish-fulvous, densely clothed with blackish pubescence, especially at the apical portion, and with numerous but ill-defined spots formed by golden-yellow pubescence; apical fringe short, blackish, golden at the extreme base; first apical cellule reaching the anastomosis, as long as the third, impinging only slightly upon the discoidal cell. *Posterior wings* pale grey, subhyaline, iridescent; fringes grey; veins brownish.

The pubescence of the anterior wings is only lightly attached; the golden markings are more conspicuous when the wings are closed.

**GANONEMA MOLLICULUM**, n. sp. *G. flavo-testaceum*. Antennæ flavæ, brunneo-annulatæ. Pedes flavi. Alæ anticæ subhyalinæ, aureo-pubescentes, brunnescenti-fimbriatæ; margine apicali oblique truncato; cellula apicali 1<sup>a</sup> petiolata: posticæ albido-subhyalinæ, albido-fimbriatæ (♂).

Long. corp.  $3\frac{1}{4}$  lin. (=7 mill.); long. antenn. 16 lin. (=34 mill.); exp. alar. 12 lin. (=25 mill.).

*Hab.* Venezuela (Göring), in *Mus. auct.*

Testaceous yellow. *Head* and palpi clothed with yellowish hairs; antennæ pale yellow, the apical half of each joint pale brownish, not toothed internally. *Legs* yellow, with yellow pubescence. *Abdomen* pale yellow: app. sup. flat, lanceolate, pale yellow, with long concolorous fringes; app. inf. two-jointed, yellow, the first joint somewhat swollen, the second ovate, shorter, turned slightly inwards, the extreme tip reddish-testaceous; between and beneath the app. inf. is the short broad penis (or cover?), which is deeply concave beneath and blackish internally, the margins thickened. (Pl. III. fig. 12.)

*Anterior wings* subhyaline, clothed with golden pubescence, which is thin in the basal portion, but becomes denser and slightly brownish in the apical; apical fringe pale brown; apical margin obliquely truncate; veins very pale yellowish; first apical cellule not reaching the anastomosis, petiolate and acute. *Posterior wings* whitish, subhyaline, the pubescence with a slight yellowish tinge; fringes very pale yellowish or whitish; veins pale.

#### Note on Genus PSEUDONEMA, M'Lachlan.

With a view to testing the value of Brauer's suspicions ('Reise der Novara,' Neuropteren, p. 14) that *P. obsoletum*, described by me in 1862, might probably be the same as *Tetracentron sarothropus*, Brauer, I have lately made a reexamination of the type in Mr. Dale's collection. There can be no doubt of the identity of my species with that of Brauer, the generic description of *Pseudonema* being faulty, in consequence of the type having been mutilated. This is one of those cases in which the older name may very justly be forced to give way to a later one: henceforward I consider *P. obsoletum* merely a synonym of *T. sarothropus*. Priority in nomenclature should, no doubt, be a rule absolute, as the only means of avoiding constant alterations depending upon what is a "correct description," as defined by individual caprice; but, as there is no rule without an exception, I think that when an author, as in my case, willingly discards a name given by him, succeeding writers should accede to his expressed wishes.

SETODES, *Rambur*.

SETODES ARGENTIFERA, nov. sp. *S. pallide lutea*. Antennæ albidæ, late fulvo cinctæ. Pedes luteo-albidi; tibiis anticis muticis. Alæ anticæ pallide fulvo-luteæ, angustatæ, seriebus punctorum argenteorum circa sex longitudinalibus ornatæ; anastomosi obliqua, cellulis apicalibus septem: posticæ albo-hyalinæ, albo-fimbriatæ (♂).

Long. corp.  $2\frac{3}{4}$  lin. (=  $5\frac{1}{2}$  mill.); exp. alar. 7 lin. (= 15 mill.).

*Hab.* India septentrionalis (in *Mus. auct.*).

Whitish-yellow, ochreous beneath. *Head*: antennæ whitish, the joints long, the apical half of each joint fulvous, basal joint bulbous, wholly yellowish; palpi whitish-yellow, clothed with concolorous hairs; eyes large, black, somewhat brassy. *Legs* pale yellowish or whitish; anterior tibiæ with no spur; intermediate and posterior each with a pair of moderately long apical spurs. *Abdomen* yellow, somewhat reddish; an elongate, obtuse lobe proceeds from the upper margin of the last dorsal segment; from beneath this lobe proceed two slender spines (app. intermed.), applied closely one against the other, and curved strongly downwards; app. inf. slender, obtuse, finger-shaped, curved strongly upwards, originating from a broad, subtriangular, lateral basal piece.

*Anterior wings* narrow, obtuse, pale fulvous, with about six longitudinal rows of small silvery-white points, one row in the area between each of the principal longitudinal veins; fringes golden yellow; veins pale; discoidal cell elongate; anastomosis oblique, and somewhat irregular (see figure); ramus clavalis simple; hence there are seven apical cells. *Posterior wings* whitish, subhyaline, with white fringes. (Pl. III. fig. 13, details.)

I have examined four males of this delicate species, taken by Mr. C. Horne in North-west India. It is closely allied to the European *S. hiera*, Kolenati, which also has unarmed anterior tibiæ, and silvery spots on the wings; but these spots are larger in *argentifera*.

## Fam. HYDROPSYCHIDÆ.

MACRONEMA, *Pictet*.

MACRONEMA POLYGRAMMATUM, nov. sp. *M. fuscum*. Caput fuscum; fronte, palpis, occipitis tuberculisque flavis: antennæ fuscae, basin versus flavæ, tenuiter fusco annulatæ. Pedes pallide flavi, trochanteribus nigro-punctatis. Abdomen flavo-ochraceum. Alæ anticæ angustatæ, stramineo-flavæ, nitidæ; strigulis transversalibus plurimis, fasciis duabus, divaricatis, obliquis, ad costam confluentibus, apiceque pallide fuscis; venis flavis; posticæ albo-hyalinæ, apice pallide griseo (♂).



Long. antenn. 16 lin. (=34 mill.); long. corp.  $3\frac{1}{2}$  lin. (=8 mill.); exp. alar.  $13\frac{1}{2}$  lin. (=28 mill.).

*Hab.* America borealis (in *Mus. auct.*).

Fuscous. *Head*: occiput with two very large, oval (or somewhat reniform) yellow tubercles on the disk, on each side, and two more elongate ones posteriorly, each of these latter extending below the eye, these tubercles clothed with short yellow hairs; face and palpi yellow, or yellowish ochreous; antennæ very long and slender, the basal joint ochreous, somewhat fuscous, the succeeding ten or twelve joints yellow, each with a very narrow fuscous ring at its apex, the rest fuscous, gradually shading off from the yellow of the basal joints. *Thorax* fuscous, hairless; the metanotum with a depressed space in the middle, which is somewhat yellowish. *Legs* pale yellow, a black dot on each of the trochanters, and the apex of the tibiæ, and the apical joint of the tarsi also with a black point; anterior tibiæ with two short and subequal apical spurs; intermediate and posterior tibiæ each with two pairs of long and unequal yellow spurs. *Abdomen* ochreous, somewhat fuscous, margin of the terminal joint with a fringe of long yellow hairs: inferior appendices very long and slender, yellow and cylindrical, approximate at the apex, two-jointed, the apical joint curved upwards; penis short, roundly capitate at its apex.

*Anterior wings* long and narrow, gradually dilated to before the apex, which is subelliptical, nearly nude, and shining, pale straw-yellow, with numerous pale fuscous markings, as follows:—rather beyond the middle are two fasciæ commencing together on the costa, but then running obliquely into the inner margin in different directions, leaving a broad triangular space between them, in which is a line and one or two points; the apex broadly fuscous, ending in a narrow transverse curved line of the pale ground-colour; the basal portion of the wing before the first fascia is occupied by numerous short transverse streaks and points, and then several similar streaks between the second fascia and the apical portion; pterostigma indicated by a subopaque space clothed with short yellow pubescence; veins pale yellow. *Posterior wings* whitish hyaline, the costa abruptly excised before the apex; extreme apex rather broadly margined with pale grey; veins greyish-white, more obscure at the apex; fringe of the anal margin whitish. (Pl. III. fig. 14.)

I possess about nine male examples, sent to me by Mr. Ridings, of Philadelphia, with other North-American insects, but without any special indication of locality. Possibly the nearest ally of the species is the Brazilian *M. maculatum* of Perty (Delect. Anim.). It is a strikingly elegant form.

**MACRONEMA DIGRAMMA**, nov. sp. *M. nigrum*, fronte ochracea. Antennæ nigræ. Pedes flavi; tibiis anticis fere muticis, extus fusco signatis. Abdomen nigrum; appendicibus inferioribus gracilibus, nigris; pene pyriformi, flavo. Alæ anticæ angustæ, ad apicem obtusæ, margine costali interioreque subparallelis, nigro-infumatæ, pubescentes; fasciis duabus transversalibus, marginem interiorem haud attingentibus, albis; posticæ pallidiores, cupreo- et orichalceo-micantes (♂). Long. antenn. 15 lin. (=32 mill.); long. corp.  $3\frac{3}{4}$  lin. (=8 mill.); exp. alar. 12 lin. (=25 mill.).

*Hab.* Minas Geraes, Brasilia (*in Mus. auct.*).

Black, almost hairless. *Head*: front swollen, ochraceous; occiput with two very large rounded swellings, whence spring short blackish hairs; antennæ very long and slender, black; palpi ochraceous; eyes brown. *Thorax* black. *Legs* yellow or testaceous, anterior tibiæ with indistinct fuscous markings externally; the spurs on these tibiæ very minute, almost obsolete; spurs on the other tibiæ long, yellow. *Abdomen* black, margins of the segments greyish; last segment above fringed with long black hairs; app. sup. obsolete; app. inf. very long and slender, two-jointed, the apical joint curved strongly inwards, fringed with black hairs; penis yellow, pyriform, the apex very obtuse; penis-cover broad, semitransparent, obtuse.

*Anterior wings* long and narrow, the costal and inner margins nearly parallel, the apex subelliptical, smoky fuscous, with rather dense, but very short, darker pubescence; two narrow, white, transverse parallel fasciæ, neither of which reaches the inner margin, but both starting from the costa, one placed rather before the middle of the wing, the other at about two-thirds of the length from the base, this latter being broadest on the costal margin; veins scarcely darker. *Posterior wings* somewhat paler, semitransparent, with beautiful coppery and brassy reflections; the costal margin deeply excised before the apex, and in the excision is an appearance of a whitish mark; fringes very short and blackish; veins darker. (Pl. III. fig. 15.)

I have one ♂ from Minas Geraes, collected by Mr. Rogers. The species is remarkable for its narrow wings, which are scarcely dilated before the subelliptical apex. The anterior tibiæ are almost spineless; but this obtains in other species of the genus as it is now constituted.

### **HYDROPSYCHE, *Pictet.***

**HYDROPSYCHE COLONICA**, nov. sp. *H. fusco-nigra*. Caput cano-hirsutum: antennæ fusæ, vix pallido annulatæ. Pedes flavescentes. Abdomen fusco-nigrum, linea utrinque albida; ♂ segmento terminali supra in lobum elevatum medianum incisum producto; appendices testacæ; inferiorum articulo ultimo brevi, subobtusio, ro-

busto; penis cylindricus, paullo sursum incurvatus; apice incrassato, bifido, infra uncis duobus latis, incurvatis, acutis instructo. Alæ anticæ angustatæ, elongatæ, flavescentes, dense saturate griseo reticulatæ; striis brevibus, ad marginem inferiorem, fusco-nigris: posticæ fuliginosæ, venis saturatoribus (♂, ♀).

Long. corp. ♂ 3 lin. (= 7 mill.), ♀  $3\frac{1}{2}$  lin. (=  $7\frac{3}{4}$  mill.); exp. alar. ♂  $10\frac{1}{2}$  lin. (= 22 mill.), ♀  $13\frac{1}{2}$  lin. (= 28 mill.).

Hab. Nova Zealandia (Christchurch, Canterbury, *Fereday*) (*in Mus. auct.*).

Blackish. Head and prothorax densely clothed with hoary hairs; antennæ fuscous, with indistinct paler annulations, and with the oblique blackish streak on each joint of the basal portion usual in species of this genus. Mesothorax, metathorax, and abdomen black or blackish, the latter with a broad whitish line along each side, most conspicuous in the ♀. Palpi and legs testaceous or yellowish. In the ♂ the terminal dorsal abdominal segment bears in its middle a nearly vertical short lobe, which is emarginate or notched: appendices testaceous or yellowish; from under the last dorsal segment proceeds a shining, semitransparent yellowish lobe, which is deeply excavated in its middle above, the sides deflexed, and the apex angular; app. sup. apparently wanting; app. inf. long, cylindrical, directed upwards, and forcipate, the second joint being short, thick, and subobtuse, clothed with short golden pubescence, and with two or three longer blackish hairs; penis cylindrical, directed upward, gradually becoming thinner to the glans, which is dark reddish testaceous and deeply bifid, bearing beneath two broad, claw-shaped, acute teeth or hooks, which curve upward. In the ♀ the apex of the last dorsal segment is bifid, and from beneath it proceeds an elongato-quadrangle testaceous lobe, from each side of which springs a long hair; sides oblique, with a broad obtuse valve on either side. (Pl. IV. fig. 16.)

Anterior wings long and narrow (broader in the ♀), greyish yellow, thickly reticulated with dark grey, and with several short, almost blackish, streaks on the inner margin, which alternate with yellowish spaces (the grey reticulation and spots are caused by the colour of the pubescence). Posterior wings wings clothed with rather dense smoky pubescence, subhyaline; the veins darker.

This species probably represents No. 14 (from Auckland) in my 'Catalogue of New Zealand *Trichoptera*,' published in the Journ. Linn. Soc. Zool. vol. x. p. 213, and of which I had then only seen one much damaged example. I have since received both sexes, in good condition, from my old friend Mr. Fereday.

It is a very ordinary-looking insect, of a type common to many European and American species, but should be easily recognized by the form of the penis; and, in fact, this organ seems to present the only safe characters whereby to separate many of the species of this perplexing and widely distributed genus.

**HYDROPSYCHE MAURITIANA**, nov. sp. *H. testacea*. Caput dense aureo-hirsutum : antennæ pallide flavo-testaceæ, brunneo annulatæ : palpi pedesque flavo-testacei. Abdomen fusco-nigrum, utrinque griseo lineatum ; appendices testaceæ ; app. inf. elongatis, cylindricis, sursum directis, articulo secundo brevi ; penis brevis, incrassatus, latus, ad apicem angulato-bifidus, infra ante apicem processu elongato, gracili, capitato, bidentato instructus. Alæ anticæ elongatæ, rufo-testaceæ, obsolete griseo reticulatæ : posticæ subhyalinæ, sparse breviterque griseo-pubescentes ; venis testaceis (♂).

Long. corp.  $4\frac{1}{4}$  lin. (=  $9\frac{1}{2}$  mill.) ; exp. alar.  $13\frac{1}{2}$  lin. (= 28 mill.).

*Hab.* Insula Mauritius, mense Julio (*in Mus. auct.*).

Testaceous. *Head* and *prothorax* densely clothed with pale golden-yellow hairs : antennæ pale yellowish testaceous, with brown annulations. *Palpi* and *legs* yellowish testaceous, a black dot on the inner side of each of the trochanters, and the extreme tip of each tibia externally blackish. *Abdomen* blackish fuscous, with sparse grey hairs, and with a grey line along each side : appendices testaceous : a broad obtuse lobe is connected to the middle of the last dorsal segment, and from beneath this arises a membranous lobe, which is excised to the base above, the sides being produced into forcipate elongations : app. inf. long, arising from a broad basal piece which is strongly fringed ; cylindrical, with long testaceous hairs ; the second joint curved inward and downward and forcipate : penis short, broad, and thick, the glans much dilated and deeply emarginate, the lobes being somewhat angular ; from the base of the glans beneath arises a long, slender, cylindrical process, which extends beyond the apex, and the tip of which is abruptly rounded, bearing above two straight, slightly divergent teeth. (Pl. IV. fig. 17.)

*Anterior wings* elongate, reddish testaceous, with obscure grey reticulations, which are most evident in the apical portion and near the base ; apical fringe very short, blackish ; veins pale testaceous. *Posterior wings* subhyaline, faintly tinged with yellowish, and sparsely clothed with short grey pubescence ; veins pale testaceous.

I possess one ♂ indicated as having been taken in the Island of Mauritius in July. It is in bad condition ; but the species is so distinct in coloration and in the structure of the penis that I have not hesitated to describe it ; I know no species in which the penis shows any approach to an analogous formation.

**HYDROPSYCHE MODICA**, nov. sp. *H. fusca*. Caput, prothorax mesothoraxque supra in medio, griseo-aureo-hirsuta : antennæ testaceæ, brunneo-annulatæ : palpi pedesque flavo-testacei. Abdomen fusco-nigrum : appendices testaceæ ; app. inf. articulo secundo gracili, spiniformi : penis gracilis, ad apicem elongato-capitatus, inermis. Alæ



anticæ angustatæ, pallide flavidescentes, haud signatæ: posticæ grisescentes, subhyalinæ (♂).

Long. corp.  $2\frac{1}{2}$  lin. ( $=5\frac{3}{4}$  mill.); exp. alar.  $9\frac{1}{2}$  lin. ( $=20$  mill.).

*Hab.* Australia (Victoria, *Edwards*) (*in Mus. auct.*).

Fuscous. *Head*, *prothorax*, and two impressed lines on the *mesonotum* densely clothed with golden-grey hairs: antennæ testaceous, annulated with brown: palpi testaceous. *Legs* testaceous; a black dot on each of the trochanters. *Abdomen* blackish; middle of terminal margin of last dorsal segment somewhat produced, obsoletely notched: from beneath this segment proceeds a short, truncate, testaceous lobe: app. inf. testaceous; the basal joint long, cylindrical, pubescent, gradually clavate at its tip; second joint short, thin, and spiniform, slightly curved: penis slender, cylindrical, the glans oval and capitate, unarmed. (Pl. IV. fig. 18.)

*Anterior wings* narrow, pale yellow, without markings; veins testaceous.

*Posterior wings* greyish subhyaline, the costal edge testaceous; veins fusco-testaceous.

I possess a male of this moderately small pale species, which presents no particular structural peculiarities, save that the second joint of the app. inf. is more spiniform than is usual.

### STENOPSYCHE, *M'Lachlan*.

When I described this genus (Tr. Ent. Soc. Lond. ser. 3, vol. v. p. 264) I was acquainted with the ♂ only. I now possess also the ♀, which differs only in its larger size and dilated joints of the intermediate tarsi; the apex of the abdomen is produced, and there are two rather long narrow valves.

#### STENOPSYCHE GRISEIPENNIS, *M'Lachlan*.

The ♀, from Assam, in my collection measures 25 lines ( $=52$  mill.) in expanse of wings. In coloration it is similar to the ♂, save that the inner margin of the anterior wings has a broad whitish streak extending from the base to the anal angle.

A second ♂, from the "Snowy Valley," near Ningpo, China (*Mr. Pryer*), resembles the Indian type; but the grey reticulated markings of the anterior wings are more delicate and uniform, not united into blotches, the posterior wings less opaque.

### SMICRIDEA, nov. gen.

*Calcaria* 1, 4, 4. *Frons* valida. *Antennæ* graciles, breves; articulo basali vix dilatato, perbrevis. *Ocelli* desunt. *Palpi*

maxillares articulo basali brevissimo, sub frontem occulto; 2° et 3° brevibus, subtriangularibus; 4° longiore, tenuiore; 5° perelongato, gracili, cæteris æquali: labiales parvi. Pedes graciles, pubescentes; ♀ tibiis tarsisque paullo dilatatis. Abdomen parvum. Alæ anticæ pubescentes, elongatæ, ad apicem vix latiores, valde obtusæ; cellula discoidali parva, oclusa; cellulis apicalibus 1, 2, 3, 4, et 5 adsunt: posticæ anticis latiores, obtusæ; radio cum sectore 1° conjuncto; cellula discoidali oclusa, cellulis apicalibus 2, 3, et 5 adsunt.

*Head* moderate, densely clothed with pubescence: vertex rounded, the posterior margin with a large elongate tubercle on each side: front, below the antennæ, strongly developed and somewhat overhanging, truncate or emarginate: eyes moderate: ocelli absent: antennæ not longer than the wings, very slender, the basal joint short, and but little thickened, each joint of the thread slightly swollen internally at its apex, thus giving an indistinctly serrate appearance: maxillary palpi with the first joint very short and concealed under the front of the head; second and third joints short, subequal, somewhat triangular; fourth joint longer and more cylindrical; fifth very long and slender, equalling the others united: labial palpi very small. *Mesothorax* short and robust. *Abdomen* short; the males provided with well-developed app. sup. and inf. *Legs* moderate, pubescent, the tibiæ and tarsi of the intermediate pair only very slightly dilated in the female; anterior tibiæ with only one, short, robust, apical spur; intermediate and posterior tibiæ each with two pairs of long and more slender subequal spurs.

*Anterior wings* long, moderately narrow, of nearly uniform width throughout, the apical portion being very little dilated, apex very obtuse, the apical margin oblique and very slightly rounded, costal and inner margins nearly straight; clothed with short dense pubescence; longitudinal veins rather strong; transverse veinlets very indistinct, and for the most part transparent; subcosta and radius straight, running nearly parallel, both reaching the costa far before the apex; apical forks 1, 2, 3, 4, and 5 all present, 4 very long, 1 and 2 not reaching the anastomosis; discoidal cell small and narrow, closed; median cell (see *antè* p. 123) longer and broader; sutural area very broad, owing to the inner margin not being concave. *Posterior wings* one-fourth shorter than the anterior, much broader; costal margin slightly concave or sinuate; apex broadly rounded; subcosta short, extending only to the middle of the costal margin, or slightly beyond; radius running very close to the subcosta, but becoming confluent with the first apical sector just after the insertion of the veinlet closing the discoidal cell; apical forks 2, 3, and 5 present.

A genus of small insects, of which I possess three species from North and South America. Distinguished from all described genera of Hydropsychidæ (excepting possibly some insects at present grouped in *Macronema*) by the anterior tibiæ being only unicalcarate; with somewhat the facies of small species of *Hydropsyche*, but shorter and broader in form, the anterior wings being less elongate.

**SMICRIDEA FASCIATELLA**, n. sp. *S. fusca*. Caput cinereo fuscoque pilosum. Antennæ fuscæ, albido semiannulatæ. Pedes flavescens; tibiis, præcipue posterioribus, fusco-hirsutis. Abdomen fuscum: maris appendices inferiores bis articulatæ, articulo ultimo deorsum curvato. Alæ anticæ fuscæ, niveo bifasciatæ, basin versus niveo nebulosæ: posticæ fusco-fuliginosæ (♂ ♀).

Long. corp. 2 lin. (=4 mill.); exp. alar.  $5\frac{3}{4}$  lin. (=12 mill.).

*Hab.* Texas (*Belfrage*) (in *Mus. auct.*).

Fuscous. *Head* clothed with cinereous hairs, the two large posterior tubercles emitting brownish-black hairs: eyes deep black: antennæ fuscæ, each joint above with a whitish spot, distinct only towards the base of the thread: palpi obscure yellowish or fuscous. *Mesonotum* fuscous, with a tuft of brownish-black hairs on each shoulder. *Legs* yellowish; the intermediate and posterior tibiæ, especially the latter, clothed with blackish or brownish hairs, principally on the outer side. *Abdomen* fuscous: in the ♂ the app. sup. seem to form two long straight blades closely applied one against the other; app. inf. long, two-jointed, directed upwards, clothed with fuscous hairs, the second joint short and acute, curved strongly downward; penis slender, cylindrical, obtuse, semipellucid: in the ♀ the extremity of the abdomen is furnished with a short subtriangular lobe projecting from the last dorsal segment and directed somewhat upward; on each side, below this, is a broadly obtuse lobe, little prominent.

*Anterior wings* smoky fuscous, almost blackish, with short golden pubescence; near the base is a white clouding, little distinct, and scarcely forming a broad fascia; beyond the middle a narrow, white, straight fascia, almost interrupted by the dark veins; and before the apex a similar fascia, which is slightly incurvated on the costal and inner margins; these markings are caused by white pubescence, and do not affect the membrane; the veins are dark; the subcosta extending slightly beyond the middle of the costa; the median cellule commencing before the discoidal, and extending to its middle. *Posterior wings* smoky blackish, with concolorous fringes; the costal margin rather irregularly sinuate; the subcosta joining the margin before the middle. (Pl. IV. fig. 19, details.)

I possess five examples taken by Mr. Belfrage in Texas in July and October.

*SMICRIDEA SAUCIA*, n. sp. *S. fusco-nigra*, aureo-pilosa. Antennæ nigrae. Pedes sordide testaceæ, tarsis fuscescentibus. Abdomen fusco-nigrum; app. sup. maris truncatis; app. inf. unguiformibus, incurvatis, acutis. Alæ anticæ fusca, pube aureo-brunnea dense vestitæ: posticæ fuliginosæ, subhyalinae, iridescentes, fusco fimbriatæ et vestitæ.

Long. corp. 2 lin. (=4 mill.); exp. alar.  $5\frac{3}{4}$  lin. (=12 mill.).

*Hab.* Peru (*Edwards*) (*in mus. auct.*).

Blackish fuscous. *Head* clothed with golden pubescence: antennæ and palpi black or blackish fuscous; the former have each joint somewhat swollen internally at its apex: eyes blackish. *Legs* dull testaceous, the tarsi slightly infuscate. *Abdomen* blackish: ♂ app. sup. band-shaped, nearly semicircular, truncate or slightly excised at the apex; app. inf. longer, claw-shaped, much incurvated, the tips acuminate and acute, turned downward.

*Anterior wings* fuscous, densely clothed with short golden-brown pubescence; veins dark; the subcosta joins the costa beyond the middle; the median cellule commences much before the discoidal, and extends slightly beyond it. *Posterior wings* smoky blackish, iridescent, with blackish fuscous pubescence and fringes; the subcosta extends beyond the middle of the costa. (Pl. IV. fig. 20, details.)

I possess about eight examples, taken by Mr. H. Edwards in Peru, probably in the neighbourhood of Lima.

*SMICRIDEA MURINA*, n. sp. *S. nigra*. Caput cinereo-pilosum. Antennæ pallide griseæ, nigro annulatæ. Pedes pallide flavi, flavo hirsuti. Abdomen fuscum: maris appendices inferiores elongatæ, graciles, bis articulatæ; articulo secundo valde deorsum curvato. Alæ anticæ aureo-murinae; punctis nonnullis in medio fuscis; fascia lata ante apicem flavo-albida: posticæ griseæ, griseo-fimbriatæ (♂ ♀).

Long. corp. 2 lin. (=4 mill.); exp. alar.  $6\frac{1}{4}$  lin. (=15 mill.).

*Hab.* Chili (*Read*) (*in mus. auct.*).

Black. *Head* clothed with cinereous hairs; those on the tubercles darker: antennæ pale greyish, with a distinct black ring at the apex of each joint; internally the joints bear a minute spine at the apex of each: eyes brown: palpi fuscous. *Legs* pale yellow, clothed with yellow hairs, which become dusky on the outside of the tibiae. *Abdomen* fuscous: in the ♂ the inferior appendices are long and slender, two-jointed, the second joint rather long, curved strongly downward, not pointed (the abdomen is injurea, so that I cannot define the general arrangement of the apical parts): in the ♀ there is a short projecting lobe at the apex above, and a broadly rounded valve on each side.

*Anterior wings* more elongate at the apex than in the preceding species; mouse-grey, with golden pubescence; in the middle are several darker



fuscous spots, not very distinct, placed on the transverse nervules and at the furcations, and these nervules appear to be slightly raised; about these spots is some pale clouding; before the apex a broad, but not conspicuous, transverse fascia caused by pale yellowish-white pubescence; the veins fuscous; the subcosta extending far beyond the middle of the costa; the median cellule commencing far before the discoidal, but not reaching to its end. *Posterior wings* pale grey, with grey pubescence and fringes (in these wings I am unable to define the exact course of the subcosta or the position of the veinlet closing the discoidal cell, and have, therefore, indicated them by dotted lines in the figure, Pl. IV. fig. 21, details).

I have one ♂ and one ♀ of this species.

### TINODES, *Leach*.

**TINODES CONSUETA**, sp. nov. *T. fusca*, aureo-pilosa. Pedes pallide flavi, coxis, femoribusque anticis intus, fuscis. Abdomen fusco-testaceum; appendicibus superioribus linearibus paullo curvatis, inferioribus ad basin marginis, supra processu elongato curvato, infra spinula instructis; lobo superiore mediano magno, triangulari, supra carinato. Alæ anticæ flavo-fuscae, dense aureo-pubescentes: posticæ infumatae, subhyalinæ (♂).

Long. corp.  $2\frac{1}{4}$  lin. (=5 mill.); exp. alar.  $7\frac{1}{2}$  lin. (=15 mill.).

*Hab.* California (*in mus. auct.*).

Blackish fuscous. *Head* and *thorax* clothed with pale golden hairs; eyes greyish yellow in their upper portion, blackish in the lower; antennæ fuscous, somewhat ochreous, more or less annulated with paler; palpi fuscous. *Legs* pale yellow; the coxæ, the anterior femora beneath, and sometimes the other femora (also beneath) fuscous. *Abdomen* fuscous, more or less testaceous or ochreous (colour probably altered), appendices pale; app. sup. long, scarcely curved, hairy, and linear; app. inf. two-jointed, the basal joint forming a broad base, excised above, and the lower angle produced into a short curved spine, the second joint forming a curved finger-shaped appendage arising from the excision of the basal joint; above there is a very large, broadly triangular median lobe placed between the app. sup., the middle with a distinct elevated carina, the sides sloping downward.

*Anterior wings* long, gradually widening from the base; the apex elliptical, dingy yellow, with dense golden-yellow pubescence, the naked circular space near the base scarcely evident; fringes golden grey; neuration arranged as is usual in *Tinodes*, greyish fuscous. *Posterior wings* greyish smoky, subhyaline, and with green reflections; fringes grey. (Pl. IV. fig. 22, details.)

I have four ♂, received from Mr. H. Edwards. It is a true *Tinodes* of quite the European type, the species being recogni-

zable by the broad triangular superior median lobe, which is carinated above. As a rule, the species of the genus, which are probably as numerous in North America as in Europe, can only be separated by the abdominal characters. *T. (?) livida*, Hagen (N. Amer. Neurop. p. 295), is unknown to me. I once saw the type of *T. (?) hirtipes*, Curtis, and noted that it was an *Apatania*, a genus belonging to another family.

## Fam. RHYACOPHILIDÆ.

### AGAPETUS, *Curtis*.

AGAPETUS CELATUS, n. sp. *A. fuscus*. Caput thoraxque flavo-hirsuti.

Pedes fuscī, femorum apicibus luteis; tibiis posterioribus griseo-fimbriatis (tibiis tarsisque intermediis ♀ valde dilatatis). Abdomen fuscum, segmento antepenultimo ventrali ♂ ♀ unidentato. Alæ anticæ nigricantes, brunneo-pilosæ, nigro-brunneo-fimbriatæ: posticæ nigro-fuliginosæ, micantes, griseo-fimbriatæ (♂ ♀).

Long. corp.  $1\frac{3}{4}$  lin. (=  $3\frac{1}{2}$  mill.); exp. alar.  $5\frac{3}{4}$  lin. (= 12 mill.).

*Hab* California (*in mus. auct.*).

Blackish-fuscous. *Head* and *prothorax* clothed with golden or yellow hairs; ocelli whitish yellow; palpi and antennæ blackish-fuscous. *Legs* fuscous, trochanters and tips of the femora yellowish; in the ♂ the posterior tibiæ are fringed with long grey hairs; in the ♀ the intermediate tibiæ and first tarsal joint are strongly dilated, concave internally, and fringed with grey hairs. *Abdomen* fuscous; in the middle of the antepenultimate ventral segment in the ♂ is an obtusely triangular short tooth, not extending beyond the margin of the segment, and a somewhat similar, but shorter and broader, tooth is also seen in the ♀; there is no tooth or tuft of hairs on the penultimate segment: in the ♂ the app. inf. are elongately triangular, curved inwards at the tips, rather widely separated when viewed from beneath, fringed with yellow hairs externally; when viewed from beneath there is an appearance of two small points projecting from the inner side of the app. inf. close to their tips; these are probably the apices of the penis-sheaths, and not connected with the app. inf.; the penis-cover seems to consist of one large piece placed above the app. inf. and nearly reaching their tips (these anal parts are so strongly applied one against the other in the dry example, that it is impossible to describe them with certainty); in the ♀ the abdomen ends in a slender ovipositor, which is curved downwards.

*Anterior wings* uniformly blackish, somewhat shining, with a moderately dense clothing of short brownish pubescence and long blackish fringes; veins blackish. *Posterior wings* blackish, subhyaline, and with

purple reflections; fringes long and grey; veins blackish. (Pl. IV. fig. 23, details.)

I have one ♂ and two ♀ from California, sent by Mr. Henry Edwards. The insect is a true *Agapetus* in every respect. The species of this genus are all small and obscure, and can only be separated by the forms of the ventral tooth or teeth, and of the appendices of the male; and even then, to ensure certainty, it is advisable always to examine living specimens when that is possible.

### EXPLANATION OF THE PLATES.

#### PLATE II.

- Fig. 1. *Grammataulius brevilinea*, M'Lach., ♀, appendices, from side.  
 2. *Stenophylax limbatus*, M'Lach., ♂, appendices, from side.  
 3. *Neophylax concinnus*, M'Lach., ♂, neurulation of wings; 3 *a*, maxillary palpus; 3 *b*, labial palpus; 3 *c*, appendices, from above; 3 *d*, extremity of abdomen and appendices, from beneath; 3 *e*, app. intermed., more enlarged.  
 4. *Notidobia griseola*, M'Lach., ♂, neurulation of wings; 4 *a*, appendices, from side; 4 *b*, app. inf., seen internally, more enlarged; 4 *c*, ♀, extremity of abdomen, from above.  
 5. *Notidobia nigricula*, M'Lach., ♂, appendices from side; 5 *a*, app. inf., seen internally, more enlarged.  
 6. *Nosopus podager*, M'Lach., ♂, neurulation of wings; 6 *a*, head; 6 *b*, anterior leg; 6 *c*, appendices, from above.  
 7. *Dinarthrum ferox*, M'Lach., ♂, neurulation of wings; 7 *a*, head; 7 *b*, appendices, from side.  
 8. *Perissoneura paradoxa*, M'Lach., ♀, neurulation of wings; 8 *a*, basal portion of antenna; 8 *b*, maxillary palpus; 8 *c*, labial palpus; 8 *d*, extremity of abdomen, from beneath.

#### PLATE III.

- Fig. 9. *Ascalaphomerus finitimus*, M'Lach., ♂, neurulation of wings; 9 *a*, head; 9 *b*, maxillary palpus; 9 *c*, labial palpus; 9 *d*, appendices, from above; 9 *e*, appendices, from side; 9 *f*, app. inf., from beneath, more enlarged; 9 *g*, ♀, head; 9 *h*, extremity of abdomen, from above; 9 *i*, the same, from beneath.  
 10. *Heteroplectron californicum*, M'Lach., ♂, neurulation of wings; 10 *a*, basal portion of antenna; 10 *b*, maxillary palpus; 10 *c*, labial palpus; 10 *d*, posterior leg; 10 *e*, appendices, from above.  
 11. *Ganonema vicarium*, Walk., ♂, appendices, from side.  
 12. *Ganonema molliculum*, M'Lach., ♂, appendices, from side.  
 13. *Setodes argentifera*, M'Lach., ♂, neurulation of wings; 13 *a*, appendices, from side.

Fig. 14. *Macronema polygrammatum*, M'Lach., ♂, wings.

15. *Macronema digramma*, M'Lach., ♂, wings.

PLATE IV.

Fig. 16. *Hydropsyche colonica*, M'Lach., ♂, appendices, from side; 16 *a*, extremity of penis, from side, more enlarged.

17. *Hydropsyche mauritiana*, M'Lach., ♂, appendices, from side; 17 *a*, extremity of penis, from above, more enlarged.

18. *Hydropsyche modisa*, M'Lach., ♂, appendices, from side; 18 *a*, extremity of penis, from side, more enlarged.

19. *Smicridea fasciatella*, M'Lach., ♂, neurulation of wings; 19 *a*, maxillary palpus; 19 *b*, appendices, from side; 19 *c*, ♀, extremity of abdomen, from side.

20. *Smicridea saucia*, M'Lach., ♂, neurulation of wings; 20 *a*, appendices, from above.

21. *Smicridea murina*, M'Lach., ♂, neurulation of wings; 21 *a*, app. inf., much enlarged; 21 *b*, ♀, extremity of abdomen, from side.

22. *Tinodes consueta*, M'Lach., ♂, neurulation of wings; 22 *a*, appendices, from above; 22 *b*, the same, from side.

23. *Agapetus celatus*, M'Lach., ♂, neurulation of wings; 23 *a*, extremity of abdomen and appendices, from side.

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Notes on the White-beaked Bottlenose, *Lagenorhynchus albirostris*, Gray. By JAMES MURIE, M.D., F.L.S., &c., late Prosector to the Zoological Society.

(PLATE V.)

[Read November 17, 1870.]

THE literature concerning this species of Dolphin dates from 1846, when Mr. Brightwell \* figured a female taken near Yarmouth under the name of *Delphinus tursio*, but which Dr. Gray † immediately afterwards showed to be a species new to science, and named it as now known. Another contributor was Eschricht ‡, who described as *Delphinus Ibsenii* what appears either this identical species, or but a variety of it, distinguished by a somewhat narrower beak, smaller-sized and more numerous teeth. The venerable Nilsson adopted Eschricht's determination in the 'Scandinavian Fauna.'

\* Ann. & Mag. Nat. Hist. vol. xvii. p. 21, pl. ii.

† *Ibid.* p. 35, pls. x., xi., and Zool. 'Erebus and Terror.'

‡ Kongl. Danske Selskab. Kjöbenh. 1847.



Van Beneden \*, in his "Recherches sur la Faune Littorale de Belgique," records the capture of two females, and describes their appearance, skeleton, intestinal canal, and organs of generation, figuring the same.

Matthias Claudius † published a memoir on *Lagenorhynchus* not long after, referring, I believe, to this and allied species; but I have not been able to get a sight of this paper.

Lilljeborg ‡, in treating synoptically of the Scandinavian Cetacea, gives notes on several skeletons in the Swedish and Danish Museums.

The specimen, a full-grown ♂, forming the subject of the present communication was captured on the south coast of England a few years ago and purchased by Mr. Gerrard for the British Museum. It was identified by that gentleman and myself as the *L. albirostris* of Dr. Gray. The skeleton is in the National Collection. The generative organs were saved by me, and are put up as a preparation among the physiological series in the College of Surgeons' Museum. Most of the viscera had been removed prior to receipt of the body.

1. *Dentition*.—In this adult male the numbers were—

$$\frac{24-23 (+2 \text{ denticles})}{23-22} : \text{ in all } = 94.$$

The four or five anterior teeth, both above and below, are small, and they increase in size to about the eighteenth. Between the eighteenth and twentieth the maximum of size is attained, those behind diminishing.

The greatest height of the teeth above the gums is 0.3 inch, the intervals between the teeth being about 0.2 inch. The teeth in the upper jaw are set nearly erect, with, however, a slight obliquity outwards; but the hindmost two or three incline somewhat backwards. The mandibular teeth have much the same direction.

The teeth of the upper jaw have somewhat of a lateral compression: their posterior surface is round, but their anterior one bevelled almost to a knife-like edge. The lower series of teeth fit into the upper set in such a way that the hind surfaces of the former are grooved and rub against the front surfaces of the latter. When the teeth are in opposition, there is an interval of

\* Mém. de l'Acad. R. Bruxelles, 1861, t. xxxii. pp. 1 to 38, pls. 1, 2.

† Dissert. de *Lagenorhynchis*. Killiae, 1853.

‡ Ray Soc. 1866, from Upsala Univ. Arsskrift, 1861-62.

0.1 inch. The two rearmost teeth of the upper jaw are without opposing mandibular ones; and the two foremost teeth of the mandible are likewise free.

2. *Cavity of the mouth*.—Without exceeding the limits of a just comparison, this region might fairly be likened to an inverted funnel, inasmuch as it is relatively long, narrow, and V-shaped. In this respect it differs from the more rounded cavity of the blunt-nosed *Globiceps*; but so far as the lining of the mucous membrane is concerned there is a closer correspondence between these two Cetacean forms. There is this difference, however, or, rather, gradation, of structural change—that the rough anterior palatine patch is of a decided **A** figure in *Lagenorhynchus*, and runs back nearly as far as the twentieth tooth from the front. The roughened patches on the mandibular rami are also very strongly marked. The entire palate and faucial region are of a pale flesh-colour; and there is no distinct uvula, though, as in the “Deductor,” the isthmus of the fauces is very much constricted and arched, whilst folds of membrane laterally bound it.

The palate is flat fore and aft, but, if anything, rather transversely concave. A lateral sulcus just within the gums, such as is well impressed in the Ca’ing Whale, barely (if at all) exists in the White-beaked Bottlenose. The interdental ridges, well pronounced in the former, are less prominent in the latter Cetacean.

The tongue is free at the tip for above an inch. In shape, as might be expected from the outline of the bony parts, it is much more narrow and pointed than in the Pilot Whale. Moreover, in the Bottlenose, it is a much softer organ. The dorsum is less smooth, and the edges crenulate.

The papillæ circumvallatæ are prominent. The frænal folds are numerous.

3. *Pharynx, Larynx, and neighbouring Structures*.—The pharynx at where the larynx arises is 3 inches in width. The channel is narrowed in front, and with a baso-median elevation behind, being sharper, at least posterior to the arytenoid cartilages. The lining-membrane is very rugose both longitudinally and laterally. The pharyngeal sphincter in this Bottlenose did not appear to grasp the larynx so firmly as in the *Globiceps* dissected previously by me. The larynx, which stands up, inclines to the left, causing the passage on its right side therefore to be the wider of the two, and leaving as much as, or more than, 2 inches of free space. The faucial mucous follicles are very numerous. These glands are large, some as much as  $\frac{1}{2}$  an inch long, and contorted.

In reference to the fleshy mass which grasps the vertical portion of the larynx, this in *Lagenorhynchus*, as in other forms, is attached to the basiocciput, inner sides of pterygoid plates, and the floor of the internal nares above the postpalatal plates. At the latter point there is a strong median glistening band. Above this the muscle divides and upwardly encircles each channel of the nares for a considerable way up. The direction of the fibres is completely circular below; and here they clasp the aryteno-epiglottic cylinder; above this they become more spiral, and superiorly assume a longitudinal direction. The result of this is that the muscle, as a whole, is an elevator and compressor.

The arytenoid cartilages project about 0·3 inch higher than the epiglottis; and they are separate, excepting a small portion at the upper end, which is firmly attached by intervening strong fibrous tissue.

Among the submucous tissues of the interior of the larynx at the root of the epiglottis, and just in front of what represents the corda vocalis, there appears to be a venous plexus of considerable thickness. The cylinder is longitudinally three-ribbed and sacculate inferiorly.

The hyo-epiglottic muscles have the same forward direction and general shape appertaining to the Grampus and Globiceps. Their origin is from the short proximal cartilages of the greater cornua. The fibres, fan-shaped, occupy  $1\frac{1}{2}$  inch or thereabouts of the body of the hyoid, and, uniting from opposite sides, run upwards and backwards to the front of the epiglottis, ascending to about its middle.

The mechanical use of these fleshy planes is evidently to draw forwards the epiglottis; but, from the position and angle at which they lay on this, they seem hardly to have the effect of dragging the epiglottis and adjoining arytenoid cartilages flat on the surface of the œsophagus. Their true action, therefore, as I conceive, must be to steady these.

Each lateral half or individual muscle seems equivalent to its opposite in size; and apparently one cannot have more influence than the other in tractile power. Nevertheless there is a certain difference in the plane of obliquity of their relative positions which would render the greater power to the left moiety. By this unequal disposition of the lines of force the glottis would have more sinistral than dextral inclination, leaving one of the pharyngeal floors wider than the other, and thus, as far as

consistent with the structures, obviating the narrowness of the alimentary channel by the presence of the upshot larynx.

Excepting in being moderately developed, the arytenoideus posticus and lateralis present no variation.

The hyoideus, a thick broad plane of fibres, is attached between the cornua. It is tendinous anteriorly, chiefly, however, on the inner side; and the fibres have a direction backwards and downwards: the outer ones are ranged in a different plane from those of the inside, being more perpendicular. It follows from this differentiation in the planes of contraction that, as with the intercostals, the resultant is a diagonal force.

4. *Articulation of the Lower Jaw.*—There is no definite or well-pronounced synovial membrane and sac. What may represent these is an intervening layer of softish fibro-elastic tissue about 0·1 inch thick, which, however, is in nowise separate or distinct from the general fibrous lining of the joint. I specially examined the parts with the object of observing whether any synovial fluid would exude on the fresh joint being cut into; but although the tissues were moist, nothing which I could identify as such exhibited itself.

Between the hollow for the lodgment of the condyle and this process itself there is a general lining of strong glistening fibres. These, at the moveable portion, are soft and yielding. Outside the joint is enwrapped, as it were, by a powerful fibrous investment, which partly interlaces or joins the interarticular fibres. The strongest band of exterior fibres, which would appear to represent the external lateral ligament of anthropotomists has a vertical direction or very slightly obliquely forwards and downwards. The attachment of this ligamentous bridge superiorly is the junction of the squamous and jugal bones, and inferiorly the anterior root of the condyle.

The fibrous substance of the socket or glenoidium merges into the temporal muscle above, and also by a continuation of fibres passes on to the venous network lying immediately on the inner side of the mandible.

John Hunter, in his memorable "Observations on the Structure and Economy of Whales" \*, was the first to state of the groups in general that a thick ligamentous substance, with oily particles in the interstices, formed the mandibular articulation, a capsular ligament and double joint being absent.

\* Phil. Trans. vol. xvi. p. 314.



The next definite assertion as to the point from specific examination, that I know of, is that of Dr. Knox, who, in his 'Cat. Prep. Whale' (1828), says of his specimen No. 3, taken from *Balæna maximus borealis* = *Physalus antiquorum*:—"The preparation was cut out of the enormous mass in which the condyles of the lower jaw move; and, of course, all the surfaces presented to view are cut surfaces. The texture is distinctly fibrous; but the fibres are so intimately interwoven together as to defy any attempt to make out an exact arrangement. It did not contain much oil, and was cut with extreme difficulty, the most powerful knife making its way through it as through a portion of caoutchouc."

More lately, 1861, Eschricht and Reinhardt\* announced their discovery in the fœtus and very young Greenland Whale, *Balæna mysticetus*, of a double synovial capsular inframaxillary joint, and supposed they "must also be found in older individuals of the same species."

Hunter's and Knox's observations, however, have been corroborated by Carte and Macalister† in the adult Pike Whale, *Balænoptera rostrata*.

It would seem, therefore, that in the adult stage at least three genera, two whalebone and one toothed Cetacean (*Physalus*, *Balænoptera*, and *Lagenorhynchus*), have no synovial capsular articulation of the lower jaw. Whether it exists in their fœtal and young condition and in other species is a matter of uncertainty, as is the reverse or its presence in the adult and old Right Whale.

The muscular structures which most powerfully influence the movement of the lower jaw are the pterygoides. The external one of these is strong, entirely fleshy, arises forwards almost within  $\frac{1}{2}$  inch of the last upper tooth; its mandibular insertion is around the inferior dentate foramen.

What represents the levator palati is strongly fleshy in front, narrowing very much behind, latterly ending in a fibro-tendinous portion, which is inserted into the post-inferior surface of the tympanic bone.

5. *The Blow-hole and its diverticular chambers*.—The external narial orifice or spout-hole has a breadth of  $2\frac{1}{2}$  inches. The front lip has a crescentic convexity forwards; but the hind one, with somewhat of a mesial peak, bluntly pouts forwards, so as to produce shallow bilateral concavities. The membrane within

\* 'Om Nordhvalhen,' Ray Soc. Transl. p. 85.

† Phil. Trans. Roy. Soc. 1868, p. 212.

the superficial margin is lined with dark pigment, and swept round by wrinkles. Eversion of the lips shows a cup-shaped spiracular cavity, on the anterior wall of which are two smooth-surfaced oval prominences meeting in the median line so as to form a V-figure; and these are connected by a strong fibrous septum to the posterior wall. They represent the alar fibro-cartilages.

The anterior or premaxillary sac extends forwards 2.6 inches in front of the orifice of the blow-hole; or if the latter be included, and a post-extension of the spiracular cavity freely communicating with it, the measurement gives 4.4 inches in extreme length. The sac is slipper-shaped, as is common to the group; near its point it is  $\frac{3}{4}$  of an inch in width, and expands behind to  $1\frac{1}{2}$  inch. The interior mucous lining is pale-coloured and smooth-surface; but there is an appearance of submucous venous vascularity at the outer and inner margins.

The maxillary or upper lateral sac is, as usual, flask-shaped, and but 2 inches deep. What I have elsewhere\* denominated the naso-frontal sac (the posterior sinus) burrows backward for  $\frac{1}{2}$  an inch, and reaches forwards for as much. Its interior was in part choked up with a greasy-like firm mucous substance.

The muscles of the forehead and nasal region of *Lagenorhynchus* are in layers like those of *Phocæna*, *Grampus*, and *Globiocephalus*; but the difference in shape of the bony areas necessitates variation in the extent of the fleshy attachments. Compared with the latter round-snouted genus, the upper layer in the White-beaked Bottlenose reaches more anteriorly in front of the eye—in fact, is continued on to the end of the maxillary or cheek-process of bone. The manner in which it is fixed to the blow-hole aperture shows that its fibres have power chiefly on the upper wall of the maxillary sac; at the same time the muscle, being fixed in front and behind the blow-hole, must act as a complete dilator of the orifice when all the fibres act simultaneously.

The second layer is stronger than the superficial one. Towards the blow-hole it is very aponeurotic. From being radially attached round the outer wall of the maxillary sac, apparently it acts as a tensor of this cavity, whilst through it and by a direct attachment of fibres fore and aft it influences dilatation of the blow-hole. What particularly attracted my attention was the

\* Camb. Journ. of Anat. and Physiol. vol. v. p. 125, fig. 1.

presence of a number of blood-vessels and nerves. These are situate between this and the upper muscle, towards their posterior aspects, and have a direction downwards and forwards. I presume them to be terminal branches of the temporal or supra-orbital roots.

The third layer, as my drawing shows, is likewise fan-shaped, but less broad than the two preceding, and consequently diminished in maxillary attachment. Its upper tendinous insertion beneath the last is upon the lower surface of the sac; and fibres proceed to the deeper chink of the blow-hole, a small fasciculus going to the front of the orifice. The latter fibres appear therefore, by a pulley kind of action, to draw the centre of the blow-hole forwards; the others tract outwards and backwards; so that their combined force is a dilator of the upper narial orifice.

The anterior portion of the fourth, fan-shaped layer, compared with the others, is immensely strong. Its outer, semicircular border is fixed upon the upper surface of the maxillary bone, its malar portion to the anterior end. The muscle's posterior border, partially covered by that next to be described, is concave and looks upwards; its anterior border has a more sinuous sweep, and reaches over the premaxillary sac and the overlying blubber, joining as a bridged band its fellow of the opposite side. An aponeurosis also connects the upper hind border of the muscle with the naso-frontal sac.

As regards the use of the muscle, the front arch, in continuation with its opposite moiety, is a powerful compressor of the nasal blubber, and consequently a contractor of the premaxillary sac. Under certain conditions, also, the said transverse band may close the blow-hole. But, again, if the transverse fibres, which decussate slightly with those of the two superficial layers, act in conjunction with the latter, which seems not improbable, they then would have a tendency to open the blow-hole.

A longish, narrow, triangular muscle of moderate thickness lies posterior to the last, and, as said, partly overlapping it. The upward tendinous apex partially covers the naso-frontal sac, and, behind the mouth of the maxillary sac, winds narrowly round the bone, and is inserted in front of the nasals. Its main office seems to be to compress the posterior or naso-frontal sac.

The fifth layer more fully discloses the lateral and posterior sacs, inasmuch as the muscle or muscles lie outside or in front of these. The fleshy parts exposed may either be considered a

double or a single muscle, the direction of the fibres being diverse but continuity indivisible. The posterior portion resembles the layers removed in being somewhat fan-shaped and lying upon the frontal outside, as far back as the naso-frontal sac. In front, with fibres of the second portion, it crosses the face aponeurotically and joins the muscle of the opposite side. The anterior second portion, naso-labialis, or premaxillary muscle, lies longitudinally the length of the beak, and sparsely coalesces at the mid line with its fellow of the opposite side. Above these is the deposit of blubber and superincumbent tissues; below a slight amount of fatty tissue and the premaxillary sacs.

Besides being a decided compressor of the premaxillary sac, the longitudinal layer last spoken of drags forwards and everts the anterior lip of the blow-hole; but the posterior fan-shaped moiety of the same layer, through its upper apical tendinous bridge and backwardly spread origin, influences retraction of the same points; and closure of the blow-hole is the sequence.

I have not figured in the drawings what constitutes a partially separate segment of the premaxillary muscle. So much are the fleshy fibres intermixed with fat that it resembles above all things a section of a well-larded tongue. It lies in front, and to some extent forms the fore wall, of the deep anterior sac. It arises from the præmaxilla opposite the last tooth, and is inserted just in front of the blow-hole. Use similar to the naso-labialis.

6. *Kidneys, Penis, and Pelvo-caudal parts.*—The two kidneys are not placed exactly opposite to each other, the right being slightly more forwards than its fellow. The former is  $10\frac{1}{2}$  inches long by  $5\frac{1}{2}$  broad; the latter is  $\frac{1}{2}$  an inch shorter. Although composed of an aggregate series of lobules, these are not simple and each distinctly separate as in *Globiceps*; for some of them, in groups of two and three, are partially fused together or coalesce. Such compound lobules have together but a single hilus and afferent duct. The vessels, as in *Grampus* and *Globiocephalus*, enter an inch below the upper end, and on the ventral or lower surface. The vein is most superficial.

The suprarenal bodies resemble those of the Porpoise, being homogeneous and firm in texture, and lying close to the renal veins, not adherent to the kidneys. Each is 2 inches long and 1 inch broad.

The penis has the usual elongate fusiform shape common to the



Cetacea\*, the orifice terminal. The bulbo-cavernosi, retractores and erectores muscles are of enormous volume.

To give an idea of the enormous volume of the infracaudalis, the so-called psoas of some authors, I need but mention that its fleshy belly measured  $51\frac{1}{2}$  inches long, with a breadth at the root of 8 inches, and depth corresponding. Within the abdomen the diaphragm overlays it for more than a foot. The fleshy part, as usual, covers nearly the entire space upon and between the transverse process and the hæmapophyses or chevron bones. On reaching the forty-fifth vertebra, strong tendons emerge from its ventral surface; but latterly and above the fleshy belly narrows, and goes on to a point outside the sixtieth vertebra. The tendons spoken of, some twenty or more in number, run backwards, but are enveloped in an aponeurotic sheath, and separate one by one from this.

Two or three of the last upper tendons unite and constitute one strong thick cord. This proceeds back quite to the hindmost caudal vertebra, where it expands slightly in an aponeurotic form.

This is essentially a powerful flexor of the tail. The upper stronger tendons, carried to the tip of the vertebral column, act the part of a long lever, analogous to the shaft of a screw propeller. The inferior tendons act also on the tail, but in a different manner from the upper ones, inasmuch as, their attachment being from the middle of the chevron bones to the last of the hæmapophyses, their power is distributed. They nevertheless distinctly influence the movements of the caudal fin or tail through their enwrapping sheath, which is directly continued on to and intermingles with the glistening and dense fibroid tissue composing the horizontal tail itself. I have shown in *Physalus* and *Globiocephalus* how the tendons are packed and enwrap each other, both in a longitudinal view and transverse section; so I need add nothing further regarding them here.

The abdominal aorta is wide, its walls moderately thin, and, as in other Cetaceans, there are intercostal plexuses. The series of transverse branches which are derived from the aorta are situate about  $\frac{1}{2}$  an inch apart, and nearly equidistant from each other; the secondary divisions commence  $\frac{3}{4}$  of an inch from the

\* *Vide* illustration of that of *Delphinus tursio* in Van Beneden's brochure "De la Composition du Bassin des Cétacés," Bull. Acad. Belg. 2nd ser. tome xxv.

aorta. I noted that the proximal orifices of the intercostals are not widely circular, but transversely elliptical, and so placed towards the main feeder (*i. e.* proceed rather forwards at an acute angle) that the flow of blood into them is not direct with the aortic stream, but at a tangent from it. Besides oblique progression of the current, the shape of the opening must hinder speedy diversion of the blood's course.

Between the aortic branches there is a range of bean-like lymphatic glands.

A large artery and vein issue from beneath the posterior end of the paramastoid, and about  $\frac{1}{2}$  an inch forwards from this divide respectively into two branches.

The lingual artery, surrounded by veins, passes within the posterior end of the genio-hyoglossus and betwixt its two heads, being finally distributed to the substance of the tongue by superficial and deep branchlets.

The lingual nerve goes to the outer side of the genio-hyoideus, sends a small branch to the upper division of the muscle; and its main division, which again bifurcates, passes along the outer side of the genio-hyoglossus, ultimately ramifying on the outer side of the tongue.

7. *Fatty Covering and some Muscles of the Body.*—All the Cetaceans, I believe, are provided with a thick robe of fat.

In the body of *Lagenorhynchus* the adipose tissue is in two layers, viz. :—an upper, covering or superficial to the panniculus; and another, lying between that muscle and the deeper series, this being  $\frac{1}{2}$  inch in thickness. Besides, here and there fat fills the interstices betwixt fleshy parts. Excepting the superincumbent layer spoken of, it is to be observed that the spinal muscles are remarkably free from it, and so are the pectoral extremities; indeed the latter and the caudal region have a fibro-tendinous sheet which takes its place.

The sheet of the panniculus carnosus is extensive, at the scapula passing up and partly over the long spinal muscles; posteriorly it thins and narrows as it runs back towards the lumbo-caudal region. The latissimus dorsi, long and thin, becomes tendinous at the sixth rib, and terminates on the chest by tendons into the eleventh and twelfth. It touches the scapula as it passes to the humerus.

There is a thick and strong costo-coracoid muscle traversing from the first sternal cartilage to the scapula. A distinct levator

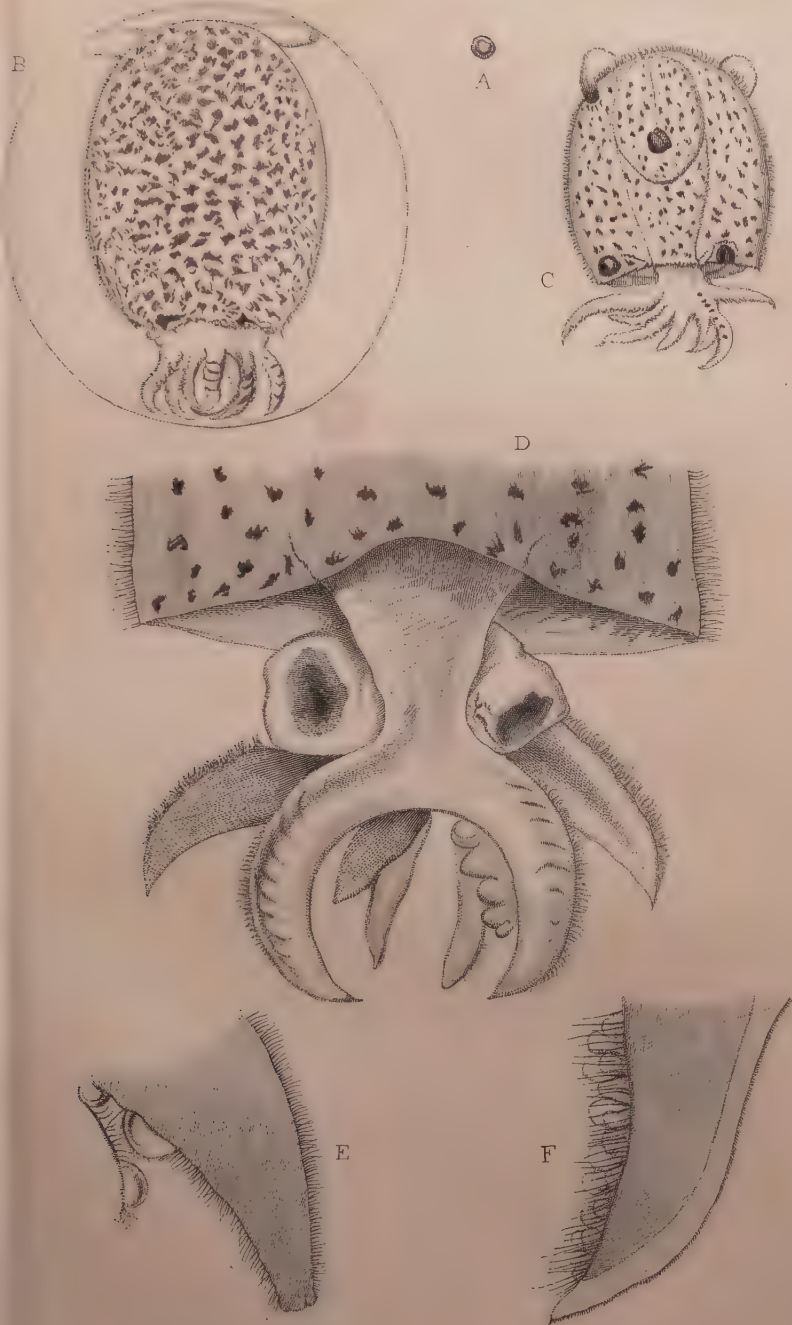
anguli scapulæ is present, and a thin rhomboideus scapulæ, or a slip which diverges towards the head part of the levator anguli scapulæ, which I take to be such.

Muscles connected with the auditory canal are very distinct in *Lagenorhynchus* (as shown in my memoir on *Globiocephalus*, fig. 29). There is a retrahens aurem (*Ret.*),  $2\frac{1}{2}$  inches long and  $\frac{1}{4}$  inch broad, with a somewhat vertical position; a short, thinner, and broader attollens (*Atl.*) in front and above the 2-curved external auditory tube. Also anteriorly, but lower than the latter muscle, there is a slip representative of an attrahens aurem (*Atr.*).

The serratus magnus has three costal digitations; its anterior insertion goes as far as the axis. A double scalenus obtains: the s. anticus, fixed to the cartilage of the first rib, is continued on to the skull; the s. posticus occupies the remainder of the first rib and proceeds to the atlas. The longus colli is continued into the chest as far as the sixth dorsal vertebra. The triangularis sterni intervenes between six sternal cartilages. The external oblique clasps more or less all the ribs, a tendon being continued to the first. Its mesial fleshy abdominal border is 3 inches broad, and partially overlaps the outer border of the rectus. What I regard as the pectoralis major has an origin from the manubrium to the fourth-rib cartilage; its fibres thence converge to the proximal root of the fore limb. Whilst the long dorso-spinal muscle corresponds with that of the other Ceti, I may note that, from the close approximation of the numerous long divergent transverse processes, the intertransversales are short, but nevertheless strong; and this remark applies to the interspinalis. The rotatores are numerous. Short muscles lash together the chevron bones.

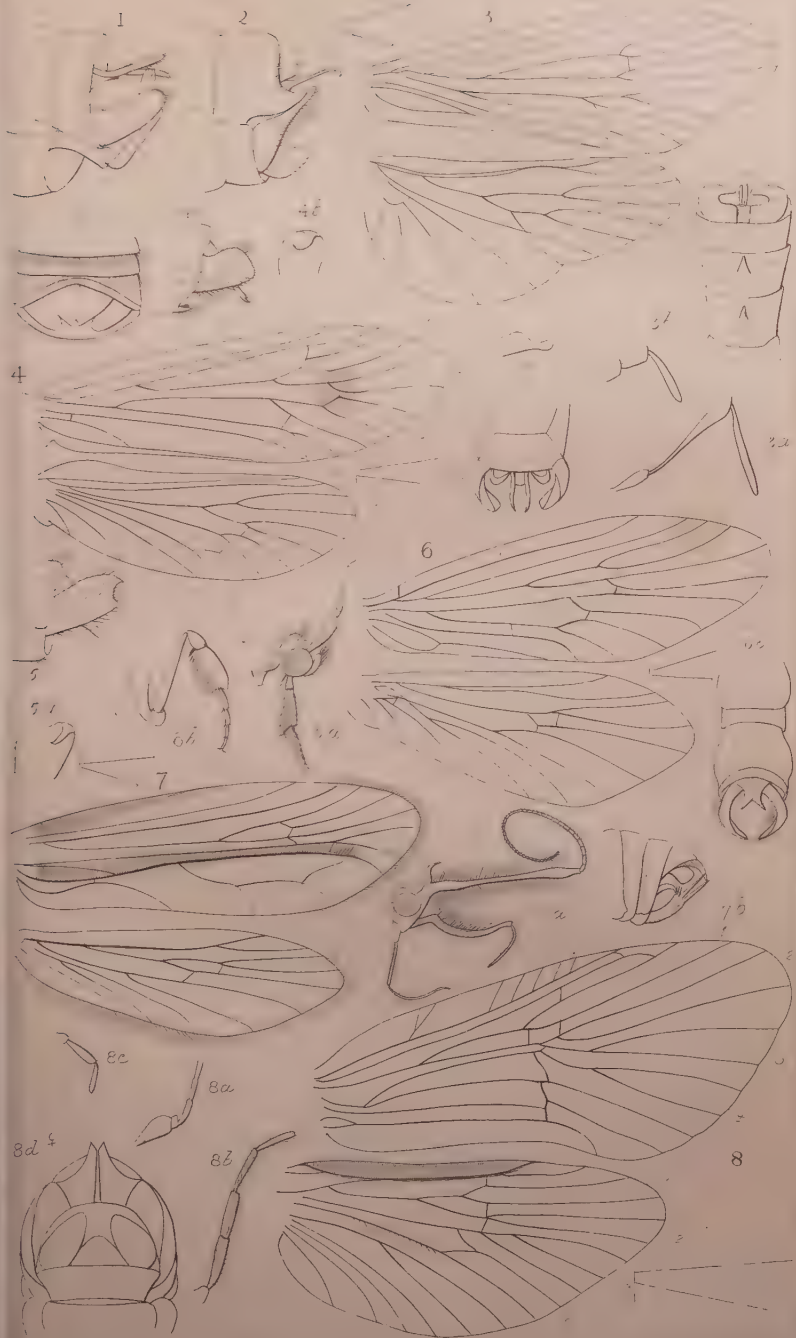
In the Porpoise, Stammius has named two small lateral muscles of the tail transversarius superior and transversarius inferior. The representatives of these in the White-beaked Dolphin are well developed. The upper one is longish, narrow, and fusiform. It lies above the transverse processes from the fortieth to the sixty-fifth or sixty-sixth vertebra, tapering at either end. The half is fleshy, the posterior half tendinous superficially in its upper half, and slightly muscular on its lower half.

The lower muscle corresponds in many respects with the preceding, but arises further forwards, and stops short a few vertebræ proximal of the other.

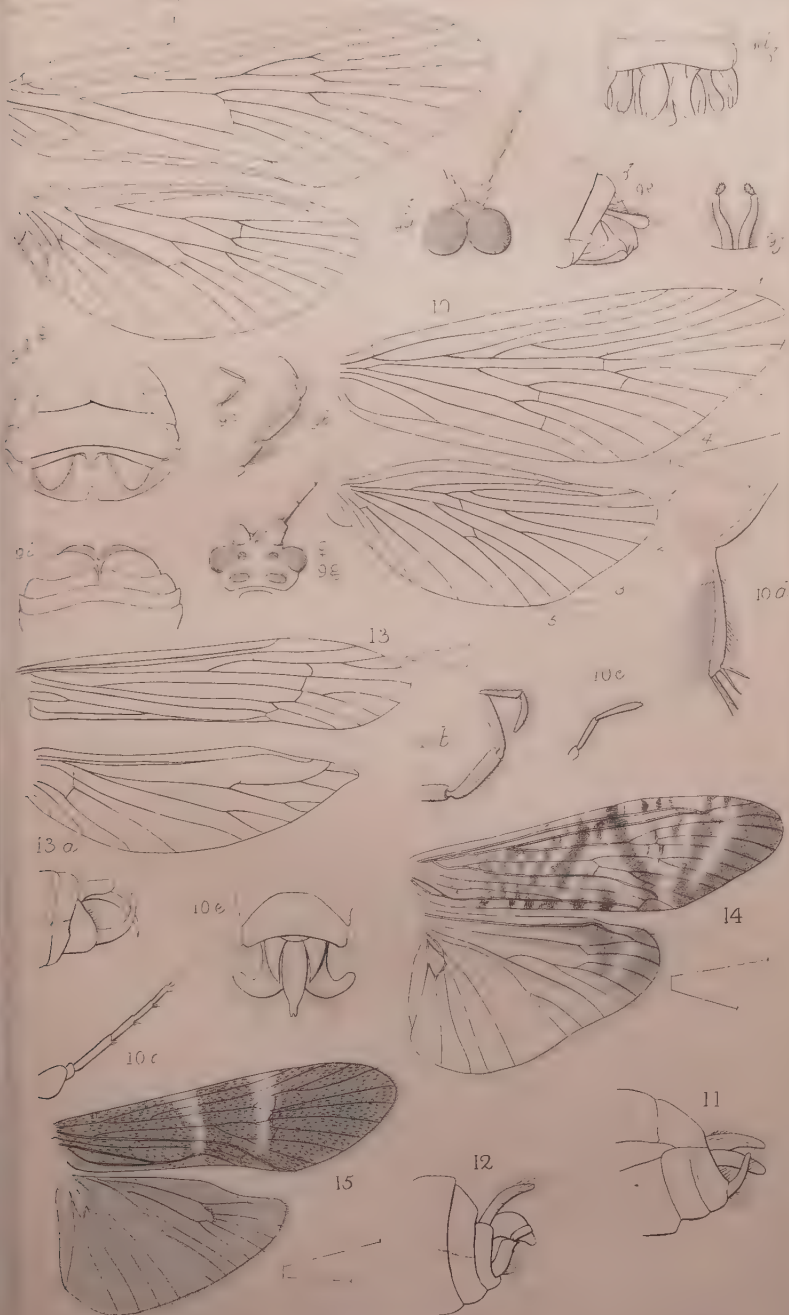
















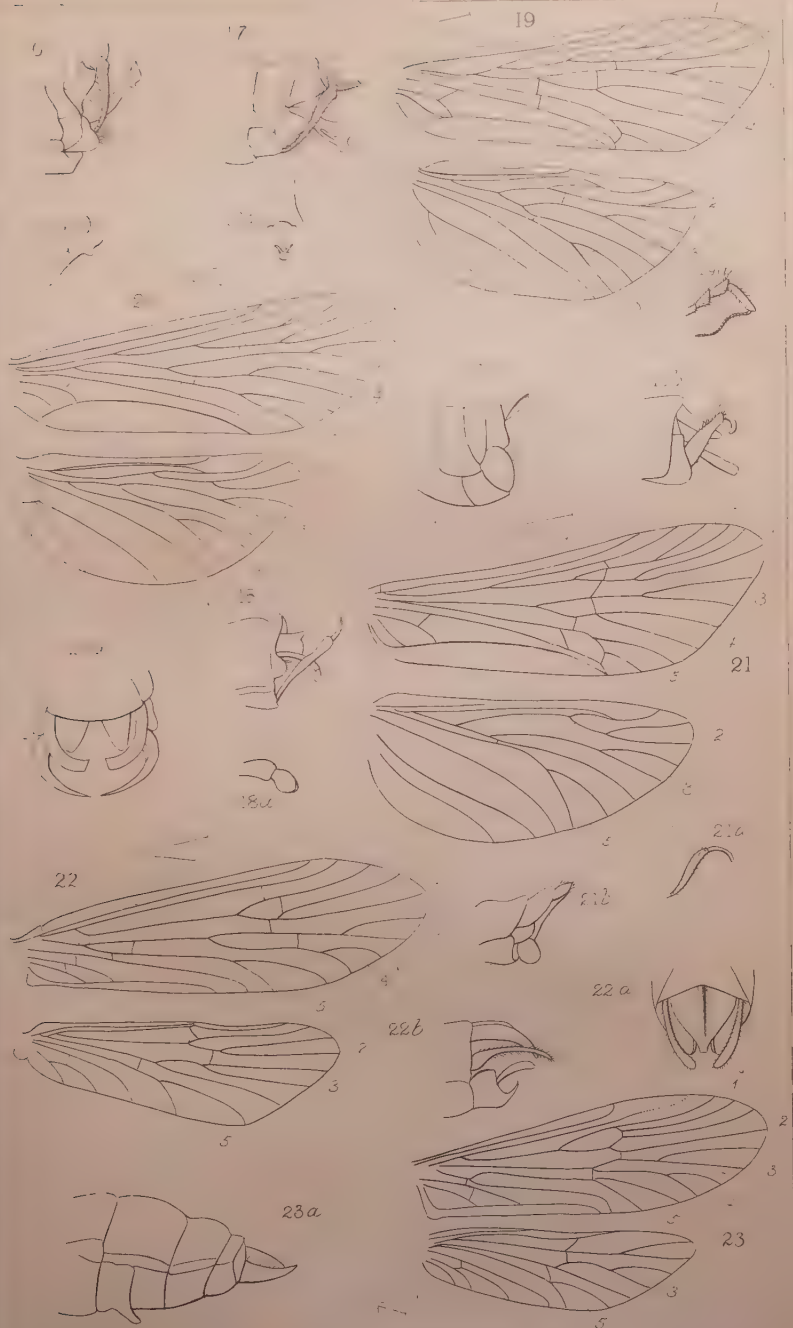




Fig. 1.

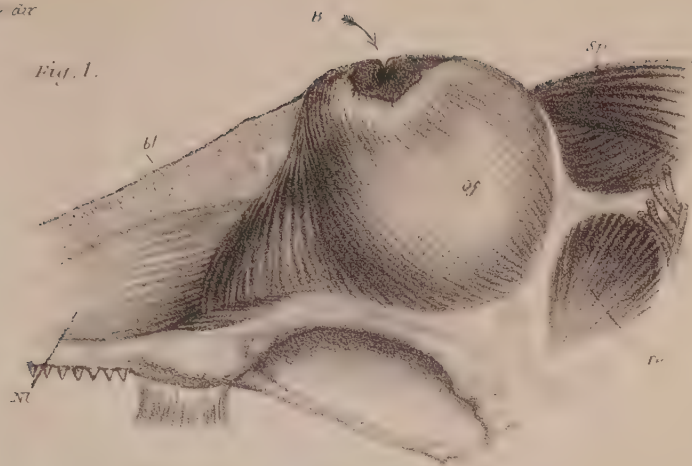


Fig. 2.



Fig. 7.



Fig. 4.



Fig. 2.

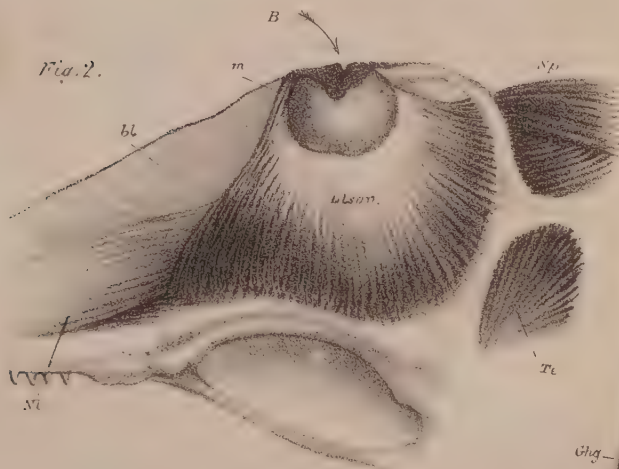


Fig. 5.

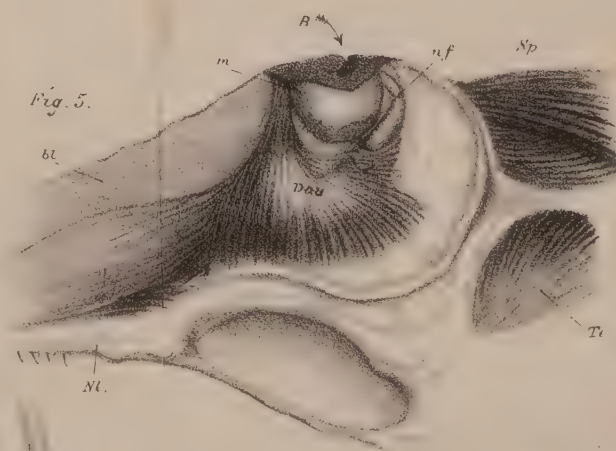


Fig. 3.

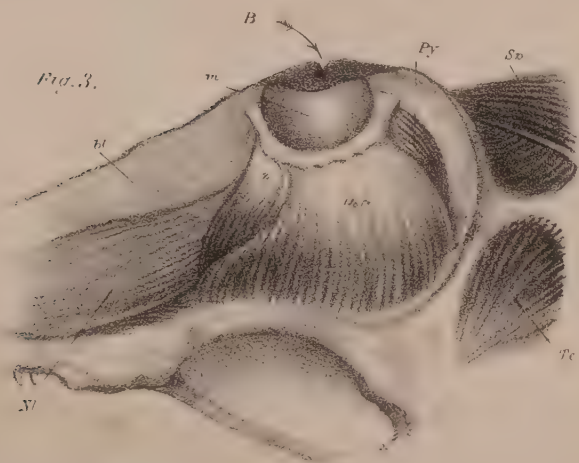


Fig. 9.

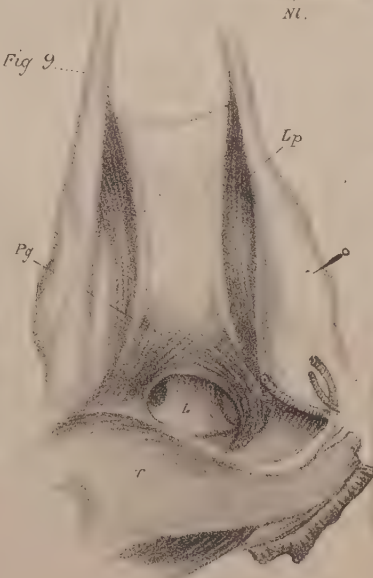
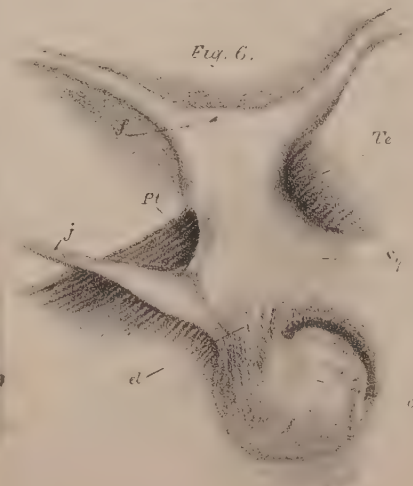


Fig. 6.







These two muscles are relatively weak lateral flexors of the spine.

#### DESCRIPTION OF PLATE V.

Fig. 1. Hinder segment of the head of the White-beaked Bottlenose (*Lagenorhynchus albirostris*), dissected to show the first or superficial fleshy layer, &c., connected with the blow-hole on the left side.

2. The same specimen, displaying the second layer.

3. The deeper third layer, maxillary sac, &c.

4. Fourth layer, from above downwards, in the same animal.

5. Undermost or fifth layer, naso-frontal sac, &c.

The lettering in these five figures agrees, and is as follows:—

*B*, through the arrow, points to the blow-hole; *m*, maxillary sac; *nf*, naso-frontal sac; *bl*, blubber and superincumbent tissues; *of*, occipito-frontalis; *Lls an*, levator labii superioris alaeque nasi; *Lsp*, levator superioris proprius; *Z*, zygomatici; *Py*, pyramidalis, compressor nasi, &c.; *Dan*, depressor alii nasi, &c.; *Nl*, premaxillary muscle including naso-labialis, &c.; *Sp*, splenii; *Te*, temporalis.

Fig. 6. A view of the articulation of the lower jaw, the joint being partially opened.

*c*, condyle; *el*, external lateral ligament; *sq*, squamous; *j*, jugal; and *f*, frontal bones.

7. The opened mouth, looked into from in front. The jaws are dragged asunder much more than is natural even at full gape, so as to bring the faucial structures into view. *T*, tongue.

8. The under surface of the right moiety of the tongue and parts between it and the pharynx.

*Mh*, mylo-hyoid; *Gh*, genio-hyoid; and *Ghg*, genio-hyglossus muscle; *T*, tip of tongue in outline.

9. Rough sketch of portion of the back of the palate and root of the tongue partially dissected.

*L*, upright laryngeal funnel; *Pg*, palato-glossus; *Lp*, levator palati; *T*, tongue.

## Contributions towards a Knowledge of the Curculionidæ.

By FRANCIS P. PASCOE, F.L.S., late Pres. Ent. Soc.

## Part II.

[Read March 2, 1871.]

(PLATES VI., VII., VIII. &amp; IX.)

**MITOPHORUS VITTATUS.** (Pl. VI. fig. 5.) *M. niger*, nitidus; capite squamulis minutis albis parce adpersus; rostro supra tricarinato, carinula exteriore supra oculum currente; antennis parce pilosis; prothorace antice paulo latiore, dorso subvittatim albido-squamuloso; elytris latitudine paulo longioribus (♀), striato-punctatis, interstitiis tertio quartoque ex linea semilunari pone humeros albido-squamulosis; corpore infra pedibusque vage albido-squamulosis. Long.  $2\frac{1}{4}$  lin.

*Hab.* White Nile.

The figure was made before I knew that the genus had already been published by Dr. Gerstaecker. The species, however, is quite new, and is a very interesting addition to the genus, as well as to the fauna of the White Nile. The structure of the rostrum is peculiar; there is a delicate ridge along the lower margin, and above is the outer of the three dorsal ridges or carinulæ; between the two is a flat surface which, for Dr. Gerstaecker, is the scrobe. This, in the species before us, would make part of the scrobe to extend *above* the eye, a peculiarity, I think, without example. (It is well represented in fig. 5 *a*, Pl. VI.) The real scrobes are, I believe, the short, deep, well-defined foveæ at the tip of the rostrum. *M. Lacordaire* (Gen. vi. p. 57) takes this view, although in a note he puts it the other way "*à volonté*," at the same time crediting *M. Gerstaecker* with just the opposite view to that which he holds as I have here stated. See *Berliner Monatsbericht*, 1855, p. 84, and *Reise nach Mossambique*, Ins. p. 311, 1862. *Mitophorus* is rather too near *Mitrephorus*, another genus of this family.

**PACHYRHYNCHUS ARGUS.** (Pl. VI. fig. 6.) *P. aterrimus*, nitidissimus, annulis impressis cæruleis viridibusque e squamis effectis ornatus, in prothorace sex, in elytris viginti-quatuor, quorum duobus communibus sutura pone medium sitis; capite rostroque fere glabris, impunctatis, apice rostri leviter punctato excepto, sulco transverso nullo; prothorace antice rotundato, basi angustato, utrinque annulis tribus decorato; elytris impunctatis; femoribus apicem versus squamoso-annulatis; metasterno abdomineque segmentis duobus basalibus utrinque viridi-annulatis. Long. 7 lin.

*Hab.* Philippine Islands.

The *Pachyrhynchi* here described are mostly due to the researches of Dr. Semper in the Philippine Islands, and comprise some of the most beautiful and isolated of the genus. Three species only were found by Mr. Wallace in the Malayan archipelago, two of which, derived from Dutch collectors, are described by Van Vollenhoven; the other, *P. cingulatus*, is new. The species vary considerably in colour and the number of spots; the latter are almost entirely formed by scales more or less densely seated in depressions of the derm; sometimes, in some individuals, a few scales may be found scattered on the head and prothorax which are absent in others.

**PACHYRHYNCHUS CONGESTUS.** *P. niger*; nitidissimus; prothorax maculis quinque, elytra maculis numerosis majoribus (circa 20), quarum duabus communibus sutura pone medium sitis, e squamis cæruleatis roseo-marginatis effectis; capite pedibusque omnino glabris, rostro apicem versus subtiliter punctulato leviter transversim sulcato, in medio late profunde excavato; prothorace oblongo, antice fortiter rotundato, postice angustiore, maculis minusculis cæruleatis ornato, una basali, una antica laterali, altera supra insertionem coxarum sita; corpore infra maculis sex similibus et sic ut in præcedente locatis. Long. 7 lin.

The scales in this species are not close together; their colour therefore is not so marked to the naked eye.

**PACHYRHYNCHUS CINGULATUS.** *P. niger*, nitidissimus; capite inter oculos ad partem inferiorem fortiter sulcato; rostro basi excepta subrude inæqualiter punctato, in medio leviter triangulariter impresso; funiculo articulis duobus basalibus modice elongatis, clava oblongo-ovali; prothorace subtransverso, utrinque rotundato, margine anteriore albo-squamoso; elytris subovalibus, apicem versus paulo productis, apice ipso singulorum subacuto angulato, manifeste seriatim punctato, in medio fascia mediocri, sutura postice macula rotundata et margine posteriore albo-squamosis; corpore infra cupro-nitente; pedibus pilis adpersis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Morty.

Allied to *P. morotaiensis*, Vollenh., but differs in the character of the rostrum, the longer scape (which might almost place it in *Apocyrthus*) and funicle, elytra more strongly punctured and produced at the apex, &c.

**PACHYRHYNCHUS INCLYTUS.** *P. splendide* metallice viridis, vittis maculisque e squamis stramineis effectis ornatus; capite inter oculos, genis rostrique apice utrinque squamosis; antennis æneis, nitidis;



prothorace vittis quatuor margineque basali squamosis; elytris singulis vittis tribus decoratis, una dorsali, una margine exteriori postice connexis, tertia intermedia, maculis 2-3 in medio fasciatim dispositis, lineisque abbreviatis duabus, una laterali postice, altera suturali prope apicem locatis; corpore infra etiam splendide viridi, sternis, segmentis duobus basalibus abdominis utrinque, femoribusque versus apicem maculatis. Long. 7 lin.

*Hab.* Philippine Islands.

**PACHYRHYNCHUS PINORUM.** *P. niger*, nitidus, fere toto glaber; rostro apice tenuiter punctato, sulco transverso obsoleto, in medio fortiter triangulariter excavato; prothorace oblongo, utrinque rotundato, margine antico sulcato; elytris canaliculatis, canaliculis squamis concoloribus indistinctis indutis, interstitiis valde convexis, subtiliter transversim corrugatis, regione suturali postice maculis quatuor pupillato-impressis, 2 pone medium, 2 apicem versus obsitis; abdomine tenuiter transverse corrugato; tibiis intus subdenticulatis. Long. 9 lin.

*Hab.* Luzon.

Dr. Semper informs me that this fine species inhabits pine-forests in the mountains of Luzon, at a height of 3000 feet.

**APOCYRTUS EROSUS.** *A. niger*, nitidissimus, subtus et in capite prothoraceque fere omnino glaber; rostro supra haud excavato, in medio longitudinaliter sulcato, sulco transverso obsoleto; prothorace subcylindrico; elytris ad latera paulo ampliatis, annulis impressis (circa 20) plerisque oblongis, albo-squamulosis; pedibus validis, tibiis posticis intus fortiter denticulatis. Long. 6 lin.

*Hab.* Luzon.

The delicate rings on the elytra, from the fineness of the scales, have the appearance of being worm-eaten. The three following *Apocyrti* have much the same general appearance; but, as will be seen from their characters, they are, for allied species, very trenchantly differentiated, especially in the females. The colour is variable.

**APOCYRTUS WALLACEI.** *A. angustus*, metallice viridis, nitidissimus, glaber, maculis cæruleatis e squamis effectis exceptis; capite antice convexo, macula inter, alteraque infra oculos notato; rostro leviter punctato, sulco transverso fortiter impresso, in medio profunde oblongo-excavato; antennis fusco-piceis; prothorace globoso, subtiliter vage punctulato; elytris prothorace angustioribus (♂), latioribus (♀), oblongo-ovatis, modice convexis, postice, præsertim ♀, recurvatis, apicibus obtusis ♂, acute mucronatis ♀, seriatim sat fortiter punctatis, maculis 6-10 ornatis, postice margine exteriori cæruleo-squa-

moso; corpore infra fere glabro; pedibus tenuiter vage pilosis. Long. 5 lin.

*Hab.* Batchian.

**APOCYRTUS SATELLES.** *A.* præcedenti affinis, sed prothorace vix globoso, impunctato; elytris ♂ postice vix, ♀ valde incurvatis et apicibus divergentibus. Long. 4-5 lin.

*Hab.* Kaioa; Morty.

The colour in different individuals varies from golden-green to steel-blue and black.

**APOCYRTUS NITIDULUS.** *A.* præcedentibus affinis, sed prothorace vix globoso, impunctato; elytris tenuiter, postice magis punctatis, et in utroque sexu nullomodo recurvatis, ad latera prope apicem sulco arcuato profunde impresso notatis, apice ♂ sat late rotundatis, in foemina postice productis, apice ipso anguste rotundatis. Long. 4-5 lin.

*Hab.* Waigiou; Salwatty.

**SITEYTES GLABRATUS.** *S.* oblongus, ovalis, niger, nitidus, supra denudatus lævis; rostro vage setuloso, inter antennis subgibboso, foveato-impresso; antennis nigris, tenuissime setulosis, scapo valido, funiculo articulis clavaque sat elongatis; prothorace oblongo, utrinque rotundato, basi paulo constricto, haud sulcato, supra subtilissime sparse punctulato; scutello nullo; elytris convexis (♀?), prothorace basi haud latioribus, obsolete seriatim punctulatis, apice anguste rotundatis; corpore infra pedibusque nigris, nitidis, his sparse griseo-setulosis. Long. 7 lin.

*Hab.* Saylee.

Very like a *Pachyrhynchus*, but congeneric with *S. lugubris*, Boh., a scarce Philippine-Islands species. The male will probably be found to have somewhat flattened elytra.

**CHERRUS SILACEUS.** *C.* ovatus, niger, fere omnino subtiliter sat dense squamosis, squamis majoribus elongatis nigris maculatus; funiculo art. basali secundo haud duplo longiore; prothorace fortiter transverso, basi truncato, supra parum depresso, granulis minutis, singulis subtilissime nigro-setigeris, sat confertim munito, lobis ocularibus obsolete; elytris late ovatis, prothoraci basi æqualibus, in medio latioribus, leviter striato-punctatis punctis minutis, singulis squamam majorem gerentibus, interstitiis latis, perparum convexis; abdomine segmentis tribus ultimis fuscis, lateraliter silaceo-plagiatis; tarsis anticis art. secundo late triangulari. Long. 7-8 lin.

*Hab.* King George's Sound (Albany).

Allied to *C. vestitus*, Pasc., but with much broader elytra and more lightly striated, the basal joint of the funicle more than twice as long as the second, &c.

**CHERRUS PUNCTIPENNIS.** *C. oblongo-ovatus, niger, subtiliter silaceo squamosus, infra pedibusque magis griseo-squamosis; capite et prothorace squamis subtilissimis aliisque majoribus irroratis, fronte punctis nudis maculata; funiculo art. basali secundo plus duplo longiore; prothorace leviter transverso, basi parum incurvo, lobis ocularibus magis distinctis, supra modice convexo, granulis exiguis numerosis mamilliformibus setigeris munito; elytris subovatis, prothorace basi angustioribus, in medio æqualibus, supra seriatim fortiter punctatis, punctis profunde impressis, singulis squamam minusculam gerentibus; tarsis art. secundo late triangulari. Long. 7 lin.*

*Hab.* Swan River (Albany).

**CHERRUS MASTERSII.** (Pl. VI. fig. 9.) *C. oblongus, niger, omnino subtiliter sat dense isabellino-squamosus; rostro basi tricarinulato, funiculo art. basali secundo fere triplo longiore; prothorace modice transverso, valde dilatato, basi paulo incurvato, lobis ocularibus obtusis, supra parum convexo, granulis numerosis mamilliformibus setigeris munito, interspationibus solis vage squamosis; elytris ovatis, prothorace angustioribus, tenuiter striato-punctatis, punctis parvis subremotis, singulis squamam majorem gerentibus, interstitiis latis, planatis; tarsis anticis art. secundo æquilato-triangulari. Long. 9 lin.*

*Hab.* King George's Sound.

These three species, with *C. vestitus*, form a distinct section of *Cherrus*, differentiated by their round, not ovate, eyes, the nearly obsolete ocular lobes, and the upper surface without tubercles and costæ. With regard to the lobes, their disappearance will probably be found to be gradual; otherwise, or perhaps as it is, they might be generically separated.

**EPISOMUS FIMBRIATUS.** *E. oblongus, ovatus, niger, squamositate vinaceo-grisea dense tectus; rostro crasso, trisulcato, sulcis laterali-bus tenuiter impressis; funiculo brevi, articulo ultimo valde transverso; prothorace oblongo, subeylindrico, rugoso, in medio fortiter sulcato; elytris valde convexis, postice ampliatis, humeris obliquis, sulcato-punctatis, punctis profundis, remotis, interstitiis latis, elevatis, maculis magnis duabus, una basali, altera apicali, fasciaque lata pone medium late fuscis viridulo-marginatis ornatis, ad latera circa puncta aureo-lavatis; corpore infra pedibusque vinaceo-griseo-squamosis, his breviter setulosus. Long. 8 lin.*

*Hab.* Sarawak.

This is the only species from Borneo in Mr. Wallace's collection, and will be at once distinguished by its broad brown band and apical spot finely edged with pale green.

**EPISOMUS TURRITUS.** *E. subovalis, niger, ubique dense griseo-squamosus; rostro crasso, latitudine fere sesquilongiore, trisulcato; funi-*

culo articulo ultimo elongato; prothorace vix oblongo, utrinque irregulariter rotundato, supra rugulis intricatis munito, in medio inæqualiter sulcato; scutello parvo, triangulari; elytris medio paulo ampliatis, postice abrupte declivibus, sulcato-punctatis, sulcis rugis denudatis transversis divisis, cum ipsis puncta quadrata formantibus, interstitiis 3. 5. 7. elevatis, illo postice tuberculo valido instructo, duobus exterioribus arcuatis, extimo in medio elevato; corpore infra pedibusque pilis adspersis. Long. 8 lin. (rost. incl.).

*Hab.* North China.

In very fresh specimens the scales so densely cover the derm that the sculpture here described is very imperfectly seen. This species, which by its tuberculate elytra is very distinct, is known in the Paris collections by the name here adopted. It is sometimes clouded with brown above.

**EPISOMUS ICONICUS.** *E. ovatus*, niger, squamis plerumque griseis juncte tectus, squamis elongatis vage interjectis; rostro latitudine haud longiore, medio fortiter sulcato, sulcis lateralibus fere obsoletis; scapo breviusculo, sensim valide crassiore, curvato; funiculo brevi, articulo ultimo clavaque nigris; prothorace transverso, utrinque paulo rotundato, supra trisulcato, lateribus vage punctato-impreso, fuscescente; scutello invisio; elytris latitudine sesquolongioribus, modice convexis, lateraliter rotundatis, remote sulcato-punctatis, interstitiis convexis, regione basali posticeque griseis, cætera fuscescentibus; corpore infra pedibusque squamis piliformibus adspersis. Long. 3 lin. (rost. incl.).

*Hab.* Cambodia.

A slightly aberrant form and the smallest of the genus, having a short curved scape, and the last joint of the funicle so closely adnate to the clava as to make the former appear six-jointed.

### DEMENICA.

(*Otiorhynchinae*.)

*Rostrum* quam caput angustius, basi transversim subsulcatum; *scrobes* subterminales, ante oculos evanescentes. *Scapus* crassus, squamosus; *funiculus* filiformis, 7-articulatus, articulis duobus basalibus longiusculis, cæteris obconicis; *clava* ovalis, distincta. *Oculi* oblongi, vix prominuli. *Elytra* basi truncata. Cætera ut in *Episomo*.

Like *Antinia*, this genus has the club distinct from the funicle; in this, as well as in the narrower rostrum and truncate base of the elytra not projected on to the prothorax, it differs from *Episomus*. In *Simallus*, another allied genus, the club is so closely



connected to the funicle that I was led to describe the latter as being six-jointed.

**DEMENICA COMPRESSA.** *D. anguste ovata, nigra, squamis viridulis griseisque ubique tecta; rostro in medio anguste carinulato, sulco transverso fere obsoleto; funiculo articulo secundo quam primo longiore; prothorace subcylindrico, squamis majoribus interjectis; scutello rotundato; elytris valde compressis, striato-punctatis, interstitiis squamis magnis griseis sat dense instructis, aliis parvis aureo-viridibus intermixtis.* Long. 4-5 lin. (rost. incl.).

*Hab.* West Africa.

#### BRYOCHÆTA.

##### (Otiiorhynchinæ.)

*Episomo* affinis, sed scapo longiore, valido; funiculo articulis ultimis valde transversis, clava crassioribus; episterna metathoracis distincta; et processu intercoxali late truncato.

In regard to the intercoxal process, Lacordaire is in error, I think, in his description; in all the species (about twenty) that I have examined it is more or less pointed anteriorly. The genus, which is like *Syntaphocerus* in habit, is composed of three very distinct species: in the first two the eyes are very prominent; in all the scape is unusually stout, impinging considerably on the prothorax, and, as well as the funicle, the legs are furnished with numerous stiff elongate scales; the tibiæ at the apex have two rows of stout black setæ.

**BRYOCHÆTA SUFFLATA.** (Pl. VI. fig. 7.) *B. ovato-ampliata, nigra, dense opalescenti-grisco-squamosa; capite inter oculos longitudinaliter sulcato; rostro in medio fortiter excavato, squamis suberectis densissime vestito; antennis griseis, funiculo saturatiore; prothorace transverso, subcylindrico, rude vage punctato; elytris subglobosis, striato-punctatis, striis nudis nitidis, inter puncta granuliformibus, interstitiis convexis; corpore infra viridi-lavato.* Long. 5 lin.

*Hab.* Old Calabar.

**BRYOCHÆTA VIRIDIS.** *B. ovata, nigra, squamis concoloribus viridibusque dense vestita; capite inter oculos sulco abbreviato; rostro in medio modice excavato, squamis concoloribus arcte adpressis; antennis nigris; prothorace longitudine haud latiore, subcylindrico, remote punctato, margine basali viridi-squamoso; elytris obovatis, striato-punctatis, striis nudis nitidis, inter puncta granuliformibus, marginibus interstitiorum squamis viridi-metallicis ornatis, postice et ad latera totis viridi-squamosis; corpore infra dense viridi-squamoso; pedibus roseo-squamosis.* Long. 5½ lin.

*Hab.* Old Calabar.

**BRYOCHÆTA PUSILLA.** *B. ovata*, picea, dense fusco-squamosa; capite inter oculos haud sulcato; rostro angustiore, supra planato; prothorace transverso, utrinque paulo rotundato; elytris subcordatis, striatis, impunctatis, interstitiis vix convexis, squamis majusculis erectis remote munitis, regione suturali fasciaque ante medium griseis; corpore infra pedibusque dense griseo-squamosis. Long. 2 lin.

*Hab.* West Africa.

#### EUPIONA.

##### (Otiiorhynchinæ.)

*Bryochæta* congruit, sed *funiculo* tenuato, filiformi, et *clava* ovata, normali.

The only exponent of this genus has precisely the habit of *Bryochæta sufflata*; but from this it is essentially differentiated by the normal form of the antennæ.

**EUPIONA ATTALICA.** *E. ovata*, nigra, squamis roseo-griseis omnino, elytris viridulis exceptis, tecta; capite rostroque in medio longitudinaliter excavatis, sulco transverso abbreviato; prothorace subcylindrico, transverso; elytris subglobosis, seriatim punctatis, punctis oblongis approximatis, glabris, nigris, interstitiis squamis viridi-aureis micantibus lineatim instructis; antennis pedibusque vage nigro-setulosis. Long. 4 lin. (rost. incl.).

*Hab.* Old Calabar.

#### ANTINIA.

##### (Otiiorhynchinæ.)

Ab *Episomo* differt *scrobibus* profundis, nudis, infra oculos inclinatiss, scapo prothoracem haud attingente.

In *Episomus* the scrobes are confined, so to say, to nearly the point of origin of the antennæ, or are marked behind by a generally broad shallow impression, which entirely disappears in front and before attaining the eye, and is invariably closely covered by scales of the same character as the rest of the rostrum. The description of this part is not very satisfactory either in Schönherr or Lacordaire. The scape in *Episomus* impinges more or less on the prothorax; but here it passes only just within the anterior border of the eye.

**ANTINIA EUPLEURA.** (Pl. VI. fig. 3.) *A. oblongo-ovata*, nigra, omnino dense isabellino-squamosa opalino-lavata, setisque numerosis interjecta; oculis subrotundatis; capite per strigam transversam a rostro distincto, fronte longitudinaliter sulcato, pone oculos transversim excavato; rostro supra longitudinaliter excavato, plaga triangulari antice excisa; antennis squamosis, funiculo art. secundo primo paulo lon-

giore, ultimo præcedente vix latiore, clava nigricante; prothorace fere quadrato sed latitudine paulo longiore, granulatim rugoso, vage nigro-setoso; elytris ovatis, seriatim punctatis, punctis remotis, interstitiis elevatis, tertio a sutura tuberculo fusco elongato fasciculato instructo, basi incurvatis, prothoraci haud contiguo, lateribus concinne aureo-viridulis; unguiculis solis nigris, nitidis. Long. 4-5 lin.

*Hab.* Penang.

**PLATYOMICUS PEDESTRIS.** (Pl. VI. fig. 8.) *P. subovatus*, omnino dense squamosus, supra pallide cervino-fuscus, albido varius; rostro paulo longiore quam latiore; prothorace transverso, utrinque angulato, medio nigro profunde sulcato, basi ad latera excavato; scutello elevato; elytris oblongo-cordatis, remotius striato-punctatis, postice singulatim tuberculo parvo instructis, ante medium plaga fasciiformi saturate fusca, pone medium et extrorsum ampliata fascia albida, decoratis, apice etiam albidis; corpore infra albido, lateribus pedibusque pallide fusco lavatis, his sat inornatis. Long. 6 lin. (rost. incl.).

*Hab.* West Africa (Fernando Vaz).

**PLATYOMICUS CORDIPENNIS.** *P. subovatus*, omnino dense griseo-squamosus, supra fusco varius; rostro longiore, medio cum capite longitudinaliter sulcato; oculis parvis, ovalibus; scapo clavaque fuscis, funiculo griseo; prothorace subtransverso, utrinque leviter rotundato, medio excavato et sat fortiter sulcato, ad latera inæquali, vittis duabus fuscis notato; scutello inconspicuo; elytris cordatis, striato-punctatis, interstitiis angustis, alternis elevatis, fasciis duabus obscuris notatis, una ante, altera pone medium, illa postice sensim evanescente; femoribus subannulatis. Long.  $4\frac{3}{4}$  lin. (rost. incl.).

*Hab.* N'Gami.

The first of these species is distinguished from *P. echinus*, Fab., by the absence of the larger tubercles. The second is a somewhat aberrant species, having the scrobes straighter, less limited behind, a smaller oval eye less coarsely faceted, and prothorax not tuberculated at the sides.

### CYCHROTONUS.

#### (Otiiorhynchinæ.)

*Rostrum* breve, capite angustius, basi transversim sulcatum; *scrobes* arcuatæ, infra oculos exeuntes. *Scapus* tenuatus, oculum superans; *funiculus* filiformis, 7-articulatus, articulis tribus basalibus breviusculis, cæteris brevioribus; *clava* distincta. *Oculi* prominuli. *Prothorax* transversus, utrinque rotundatus, basi apiceque truncatus. *Elytra* basi prothorace haud latiora,

compressa. *Femora* modice incrassata; *tibiæ* rectæ, corbulis posticis cavernosis; *unguiculi connati*. *Processus* intercoxalis antice angulatus.

This genus has more the habit of some of the species of *Sciobius* than of *Episomus*, to which, on account of its cavernous corbels and connate claws, it is most allied.

**CYCHROTONUS VIDUATUS.** *C. ovalis*, niger, subnitidus, fere glabratus; capite inter oculos sulcato; rostro fortiter tricarinato; prothorace crebre punctato, punctis nonnullis squama alba repletis; elytris profunde sat confertim fortiter punctatis, interstitiis subtilissime punctulatis squamis albis remote adspersis; corpore infra pedibusque sparse albo-squamosis. Long. 4 lin. (rost. incl.).

*Hab.* N'Gami.

The genera allied to *Episomus*, of which two only were known to Lacordaire, may be thus tabulated:—

Prothorax produced on each side at the base.

*Zyrcosa*, Pasc.

Prothorax not produced.

Elytra broader at the base than the prothorax.

*Platyomicus*, Thoms.

Elytra not broader at the base than the prothorax.

Scrobes at the apex of the rostrum nearly contiguous.

*Syntaphocerus*, Thoms.

Scrobes widely apart at the apex.

Intercoxal process gradually narrower and forming an angle anteriorly.

Elytra at the base projecting on the prothorax.

Scrobes terminating before the eye.

*Episomus*, Schön.

Scrobes terminating beneath the eye.

*Antinia*, n. g.

Elytra truncate at the base.

Scrobes terminating beneath the eye.

*Cychrotonus*, n. g.

Scrobes terminating before the eyes.

Rostrum as broad as the head. *Simallus*, Pasc.

Rostrum narrower than the head.

*Demenica*, n. g.

Intercoxal process broad and truncate anteriorly.



Club of the antennæ not thicker than the funicle.

*Bryochæta*, n. g.

Club of the antennæ much thicker than the funicle.

*Eupiona*, n. g.

#### TIPHAURA.

(Molytinæ.)

*Rostrum* elongatum, cylindricum, tenuatum, apice paulo latiore; *scrobes* subbasales, partem superiorem oculi attingentes. *Scapus* brevissimus; *funiculus* 7-articulatus, articulis duobus basalibus breviusculis, cæteris brevioribus, gradatim crassioribus, *clava* parva brevissima, articulo ultimo funiculi arcte applicata. *Oculi* transversi, infra contigui, grosse granulati. *Prothorax* transversus, antice perparum tubulatus, utrinque subcostato-marginatus, parallelus. *Scutellum* inconspicuum. *Elytra* late ovata, prothorace latiora, basi incurvata. *Pedes* breves; *femora* incrassata, mutica; *tibiæ* validæ, fere rectæ, unco horizontali armatæ, posticæ corbellis cavernosis; *tarsi* angusti, articulis tribus basalibus infra apice ciliatis, quarto elongato; *unguiculi* divergentes; *coxæ* anticæ contiguæ. *Metasternum* breve. *Abdomen* sutura prima obsoleta, segmentis 3° 4° angustissimis.

It is with some hesitation that I place this genus with Molytinæ, the subbasal *scrobes* being at variance with the character of the subfamily; it may be only a sexual peculiarity. The ciliate *tarsi* are found in *Anisorhynchus*; the partially ridged margin of the side of the prothorax occurs also in some *Anchoni*.

TIPHAURA FUNEREA. (Pl. VI. fig. 10.). *T.* late ovata, nigra, nuda; rostro prothoracis longitudini æquali, æquilato (♂?), tenuiter oblongo-punctato, basi subsulcato; antennis obscure piceis; prothorace subtiliter crebre papillato-punctato, in medio linea impunctata notato; clytris striatis, interstitiis latis, subplanatis, obsolete punctatis; corpore infra sordide fusco; pedibus setulis silaceis dispersis; tarsis articulo ultimo subtestaceo. Long. 4 lin.

*Hab. Para.*

#### STYANAX.

(Gonipterinæ.)

*Rostrum* breve, validum; *scrobes* obliquæ, vel subtransversæ, infra oculos arcuatæ. *Scapus* perbrevis, oculum attingens; *funiculus* crassus, articulis duobus basalibus longioribus, cæteris valde

transversis, gradatim latoribus; *clava* breviter ovata, distincta. *Oculi* oblongi, transversi, fortiter granulati. *Prothorax* conico-cylindricus, basi subbisinuatus, apice parum productus. *Elytra* prothorace latoria, oblonga, parallela, modice convexa. *Femora* compressa, incrassata, infra dentata; *tibiæ* validæ, compressæ, intus bisinuatæ et denticulatæ, apice uncis duobus armatæ; *tarsi* robusti; *unguiculi* parvi, liberi. *Abdomen* normale. *Processus* intercoxalis anguste triangularis.

The only character by which this genus differs from *Gonipterina* as defined by Lacordaire is the narrow intercoxal process. As to the spurs of the *tibiæ*, they are well marked in some *Gonipteri*, e. g. *G. lepidotus*, though there is but one to each. The solitary specimen on which this genus is founded is the sole representative of the subfamily, of which more than fifty species are found in Australia, contained in Mr. Wallace's Malayan collections.

**STYANAX CARBONARIUS.** (Pl. IX. fig. 4.) *S. ater*, nitidus; capite rostroque crebre punctatis, hoc in medio breviter carinato; prothorace confertim rude granulato, granulis singulis apice setulam gerentibus; scutello rotundato, ochraceo-squameso; elytris sulcato-favosis, interstitiis paulo elevatis, quinto postice tuberculo mediocri instructo, apicibus intus submarginatis; corpore infra pedibusque rugoso-punctatis, setulis pallidis adpersis. Long. 5 lin.

*Hab.* Sumatra.

#### APARETE.

#### (Aterpinæ.)

*Rostrum* quadrangulare, capite vix longius; *scrobes* submedianæ, obliquæ, arcuatæ, infra oculos terminantes. *Oculi* rotundati, parum prominuli, subgrosse granulati. *Scapus* sensim incrassatus; *funiculus* 7-articulatus, articulo primo longiusculo, cæteris transversis, ultimo clavam quasi incipiente. *Prothorax* oblongus, cylindricus. *Elytra* subparallela, convexa, prothorace multo latoria, basi apiceque truncata, humeris producta. *Femora* in medio incrassata; *tibiæ* flexuosæ, muticæ; *tarsi* lineares, subtus ciliati, articulo primo breviter triangulari, secundo transverso, tertio haud lobato, quarto valido, cæteris conjunctim longiore; *unguiculi* liberi, divergentes. *Abdomen* normale.

The quadrangular rostrum, the seventh joint of the funicle closely connected to the club, and narrow tarsi, ciliated beneath, form a very trenchant diagnosis of this genus, which in habit is similar to *Ethemaia*.

**APARETE PALPEBROSA.** *A. oblonga*, fusca, dense griseo-squamosa, supra granulis fuscis oblongis irregulariter dispersis; capite supra oculos bicristato, cristis squamis elongatis coronatis, fronte rostroque in medio longitudinaliter excavatis; antennis dense griseo-squamosis, clava nigra; prothorace pone apicem transverse depresso, utrinque perparum rotundato; scutello oblongo, apice rotundato; elytris sulcatis, interstitiis angustis 3. 5. 7. elevatis, interstitio primo tribus, secundo quatuor fasciculis squamosis munitis, lateribus subparallelis, pone medium sensim angustis, apicibus subacuminatis et setoso-marginatis, supra pone medium fascia arcuata dilatiore notatis; corpore infra pedibusque griseo-squamosis, setis interjectis. Long.  $3\frac{1}{2}$  lin.

*Hab.* South Australia.

### DEXAGIA.

(*Aterpinæ*.)

*Caput* exsertum, supra quadratum. *Rostrum* breve, validum, subdifforme; *scrobes* laterales, obliquæ, infra rostrum conniventes; *mandibulæ* crassæ. *Oculi* rotundati, prominuli, laterales, e prothorace distantes. *Antennæ* tenuatæ; *scapo* curvato, subclaviformi; *funiculo* 7-articulato, art. duobus basalibus longiusculis, primo crasso, cæteris brevioribus; *clava* distincta, ovali. *Prothorax* subcylindricus, basi apiceque truncatus. *Elytra* elongata, cylindrica, prothorace latiora, basi projecta, postice subito declivia. *Femora* vix crassa; *tibiæ* anticæ et intermediæ sat attenuatæ, curvatæ, posticæ rectæ, omnes unco obliquo terminatæ; *tarsi* modice elongati, art. tertio late bilobo, ultimo attenuato; *unguiculi* liberi. *Abdomen* segmentis duobus basalibus ampliatis. *Processus* intercoxalis æquilateraliter triangularis.

A remarkable genus, which I have no hesitation in connecting, although at a long interval, with the Australian *Ethemaia* and neighbouring genera.

**DEXAGIA SUPERCILIARIS.** (Pl. VII. fig. 2.) *D. elongata*, nigra, dense umbrino-squamosa, albido varia; capite supra oculum elevato-cristato; rostro supra in medio bituberculato, apicem versus excavato, nigro nudo, crebre et fortiter punctato; antennis ferrugineis, nitidis, funiculo articulis quatuor ultimis ovatis, clava magna; prothorace oblongo, pone apicem late constricto, lateribus albidis: elytris seriatim punctatis, punctis magnis, exterioribus quadratis, interstitiis 3. et 5. costatis, costis postice subito determinatis, in medio et ante apicem cristatis, lateribus apiceque albidis; corpore infra pedibusque sordide albidis; abdomine segmentis tribus ultimis fuscis. Long. 4 lin.

*Hab.* Batchian.

## HYPERMETRA.

(Aterpinæ.)

*Dexagiæ* omnino congruit, præter *scrobes* infra rostrum haud conniventes; et *tibiæ* apice latiores, uncis carentes. *Corpus* cylindricum.

The only exponent of this genus is a peculiar insect, very different in appearance to the last, though the generic characters are almost the same. The scales on the upper part, except at the apex of the elytra, are so exactly like the derm they cover as to be easily overlooked.

**HYPERMETRA ANALIS.** (Pl. IX. fig. 5.) *H. elongata*, brunnea, supra squamis concoloribus, apice elytrorum excepto, tecta; capite rostroque sat nude pallido-squamosis, hoc dimidio apicali paulo excavato; antennis piceis; funiculo articulis quinque ultimis rotundatis, extrorsum sensim crassioribus; prothorace latitudine fere sesquilongiore, disperse punctato, punctis leviter impressis, unisquamigeris; scutello distincto, orbiculari; elytris latitudine plus triplo longioribus, striato-punctatis, punctis elongatis, vix approximatis, unisquamigeris, interstitiis modice convexis, apice sat subito declivibus, dense albido-squamosis, et singulatim tuberculo magno instructis; corpore infra pedibusque subpiceis, squamis albidis vix dense tectis. Long.  $2\frac{1}{2}$  lin. (rost. incl.).

*Hab.* Mysol.

The number of genera of *Aterpinæ* has now been so augmented that the following Table will be useful:—

Tibiæ spurred . . . . . *Dexagia*, n. g.

Tibiæ not spurred.

With ocular lobes.

Funicle 6-jointed.

Metasternum normally long . . . . . *Aterpus*, Schön.

Metasternum short . . . . . *Iphisaxus*, Pasc.

Funicle 7-jointed.

Shoulders pointed, often tuberculate. *Lophotus*, Schön.

Shoulders rounded . . . . . *Rhinoplethes*, Pasc.

Without ocular lobes.

Body more or less ovate.

Scrobes median or basilar.

Scrobes median, oblique . . . . . *Pelororhinus*, Schön.

Scrobes basilar, transverse . . . . . *Rhinaria*, Kirby.

Scrobes terminal, or nearly so.



Club distinct from the funicle.

Tarsi linear . . . . . *Medicasta*, Pasc.

Tarsi broader, the third joint more or less dilated.

Rostrum elongate, much narrower than the head.

*Methypora*, Pasc.

Rostrum shorter, nearly as broad as the head.

*Ethemaia*, Pasc.

Club closely united to the funiculus.

*Aparete*, n. g.

Body cylindrical . . . . . *Hypermetra*, n. g.

**PÆPALOSOMUS ZONATUS.** *P. elongatus*, cylindricus, niger, fasciis niveo-squamosis variis; rostro piceo, nitido, vage punctato; antennis testaceis; prothorace leviter punctato, in medio longitudinaliter sulcato, utrinque niveo-squamoso; scutello subrotundato; elytris prothorace paulo latioribus, striato-punctatis, interstitiis planatis, vage setulosis, fasciis tribus niveis ornatis, una subbasali, una media, altera postica; corpore infra pedibusque subnitidis, tibiis tarsisque pubescentibus. Long. 4-5 lin.

*Hab.* Batchian; Morty; Gilolo; Ceram; Kaioa; Key; Aru; Dorey; Saylee.

The only other described species of this genus (*P. dealbatus*, Boisd.) is, in a fresh state, densely covered with an elongate inflorescence, pure white, and very delicate. There is some doubt in regard to its locality, Schönherr giving Manilla, and Boisduval New Guinea; it probably occurs in both; Mr. Wallace found it at Sarawak and in Gilolo, Batchian, Morty, Makian, Kaioa, Tidore, Bouru, Ternate, Key, and Waigiou. Lacordaire was acquainted with two other species, from Borneo and Cochin China respectively; the former is probably the one here described. A specimen from Java is shorter and less cylindrical, and is possibly distinct.

**HYLOBIUS FASCIATUS.** (Pl. VII. fig. 9.) *H. ovatus*, niger, nitidus; capite rostroque fere nudis, illo crebre punctulato, inter oculos fovea profunda insculpto, hoc fortiter vage punctato, punctis unisquamigeris; funiculo articulo ultimo obconico; clava elongato-ovali; prothorace subconico, crebre sat fortiter punctato, fascia nivea subapicali, supra interrupta, notato; scutello subcordiformi; elytris basi latioribus, postice gradatim angustatis, fortiter seriatim punctatis, macula utrinque basali fasciisque duabus niveo-squamosis, una in medio interrupta, altera communi postica decoratis; corpore infra pedibusque pilis exiguis niveis vage irroratis. Long. 8 lin.

*Hab.* Morty; Batchian; Ceram.

*Hylobius* and its ally *Aclees* appear to be among the commonest genera of the Malayan archipelago; and this is one of the finest species; the others described are very distinct, and have a much more decided look than any of their North-American or European congeners that I have seen.

**HYLOBIUS NOTATUS.** *H. oblongus*, niger, opacus; capite crebre punctato; rostro subtenuato, fortiter punctato, punctis unisquamigeris, lineis longitudinalibus elevatis munito, transversim sparse setosulo; antennis piceis; prothorace oblongo, sat crebre rugoso-punctato, interstitiis granuliformibus, vage albo-setosulis; elytris prothorace multo latioribus, oblongis, subparallelis, apicem versus sensim angustatis, apicibus acuminatis, supra striato-punctatis, punctis foveiformibus, approximatis, interstitiis subtuberculatis, tuberculis setula alba instructis, singulo elytro fasciis niveis abbreviatis duabus vel tribus ornato, una laterali ante medium, altera postica, aliquando tertia apicali; corpore infra pedibusque setulis exiguis valde dispersis. Long. 4-5 lin.

*Hab.* Java; Sarawak.

**HYLOBIUS SCROFA.** *H. oblongo-ovatus*, niger, squamulis minutis silaceis dispersus; capite inter oculos fovea parva impresso; rostro longitudine prothoracis, in medio tricarinulato, carinulis punctis interruptis impressis, squamis filiformibus transversim sitis fere omnino tecto; funiculo art. ultimo valde transverso; clava brevi pubescente; prothorace oblongo subconico, rugoso-punctato, punctis singulis squamas unicam—tres gerentibus; scutello subcordiformi, dense albido-squamoso; elytris basi latioribus, utrinque gradatim angustioribus, apicibus rotundatis, sulcato-punctatis, punctis oblongo-quadratis, approximatis, interstitiis angustis, parce squamosis, in singulo elytro maculis duabus albis, una ante, altera pone medium, e squamis formatis; corpore infra pedibusque nigris nitidis, illo squamis silaceis, his squamis griseis dispersis. Long. 7 lin.

*Hab.* Sarawak.

**HYLOBIUS RUBIDUS.** *H. oblongus*, obscure rufus, supra fere denu-datus; capite rostroque basi irregulariter punctulato, vage flavescenti-squamosis, hoc subtenuato, prothorace manifeste longiore; funiculo articulo ultimo transverso; prothorace subconico, rugoso-punctato, punctis unisquamigeris, interstitiis granuliformibus, in medio magis rugoso; scutello subtriangulari; elytris prothorace multo latioribus, striato-punctatis, punctis nudis, interstitiis latis subplanatis, basi paulo elevatis, apicem versus coarctatis, compressis, apicibus anguste rotundatis; plagis septem nigris decoratis,—una communi basali, tribus in singulo elytro pone medium, quarum una dorsali,—maculisque duabus lateralibus e squamis ochraceis formatis; corpore

infra pedibusque rufescentibus nitidis, punctis unisquamigeris dispersis; femoribus magis incrassatis, infra macula nigra notatis. Long. 5 lin.

*Hab.* Sarawak.

**HYLOBIUS PAPULOSUS.** *H.* oblongus, angustus, ubique pilis albidis exiguis parce adpersus; capite rostroque, apice excepto, inæqualiter punctatis, punctis plurimis unisquamigeris; antennis subtestaceis; funiculo tenuiore; prothorace subconico, confuse rude punctato, interstitiis granulatis, in medio linea paulo elevata notato; scutello transverso; elytris striato-punctatis, punctis nudis, interstitiis subconvexis, apicibus rotundatis, maculis e pilis condensatis pallide flavescentibus vage adpersis; pedibus longiusculis; femoribus attenuatis, extus saturatioribus. Long. 4 lin.

*Hab.* Java.

**HYLOBIUS APHYA.** *H.* oblongus, angustus, niger, subnitidus, pilis flavescentibus adpersus; rostro prothorace paulo brevior, basi sulcato-punctato, extrorsum nitido sensim subtiliter vage punctulato; antennis ferrugineis, clava ovata, distincta; prothorace subtransverso, utrinque modice rotundato, basi truncato, supra rugoso-punctato; scutello triangulari; elytris prothorace multo latioribus, subparallelis, apicibus angulato-mucronatis, striato-punctatis, punctis subapproximatis, interstitiis parum convexis, maculis paucis, præcipue postice, e pilis condensatis effectis, adpersis; corpore infra pedibusque nigris nitidis, parce pilosis. Long. 4 lin.

*Hab.* India.

A narrow species, otherwise not unlike *H. abietis*.

## ECTINURA.

(Hylobiinae.)

*Rostrum* subtenuatum, arcuatum: *scrobes* subterminales, obliquæ. *Oculi* mediocres, subovati, subtenuiter granulati. *Antennæ* graciles; *scapus* apice clavatus; *funiculus* 7-articulatus, articulis duobus basalibus longiusculis, secundo longiore, cæteris breviter obconicis, ultimo crassiore; *clava* adnata, articulata, velutina. *Prothorax* oblongus, subcylindricus, basi subbisinuatus, lobis ocularibus distinctis. *Elytra* parum convexa, angusta, pone medium gradatim attenuata, singula in caudam cylindricam producta. *Pedes* attenuati; *femora* paullo incrassata, infra dente parvo armata; *tibiæ* teretes, elongatæ, flexuosæ, apice uncinatæ; *tarsi* longiusculi, articulo tertio profunde bilobo; *unguiculi* divaricati. *Abdomen* segmentis duobus basalibus peramplis.

A remarkable form, on account of the prolongation of the clytra as in some of the *Brenthidæ*. The only example I have seen was kindly presented to me by Mr. E. Sheppard, and belonged to the late Mr. Curtis. There was no locality named; but the colour of the bit of paper attached, in the old slovenly way, appeared to indicate that it was from South America; its resemblance, however, to *Hylobius aphyæ* leaves very little doubt in my mind that it is from India.

**ECTINURA BRENTHOIDES.** (Pl. VII. fig. 10.) *E. angusta*, piceofusca, subnitida, squamis dispersis silaceis vestita; capite inter oculos depresso; rostro prothorace cum capite parum longiore, basi confertim punctato; antennis fuscis, nitidis; prothorace utrinque leviter rotundato, antice paulo angustiore, crebre impresso-punctato, punctis singulis squama flava munito; scutello triangulari, nitido; elytris prothorace paulo latioribus, humeris rotundatis, supra leviter at sat vage punctatis, punctis squamigeris, interstitiis squamis minoribus parcius dispersis, pone medium squamis majusculis condensatis (circa sex) maculam parvam formantibus; corpore infra pedibusque disperse squamosis. Long. 5 lin.

*Hab.* India?

#### SCOLITHUS.

(*Hylobiinae*.)

*Rostrum* validum, modice elongatum, parum arcuatum, utrinque stria dimidiata ante oculum impressum; *scrobes* præmedianæ, obliquæ, infra oculos longe exeuntes. *Scapus* breviusculus; *funiculus* 7-articulatus, art. brevibus, quinque ultimis transversis; *clava* brevis, adnata, quadriarticulata. *Oculi* grosse granulati, transversii, laterales. *Prothorax* oblongus, basi bisinuatus, lobis ocularibus distinctis. *Elytra* oblongo-ovata, versus apicem callosa. *Pedes* validi; *femora* in medio incrassata, subtus dentata; *tibiæ* compressæ, flexuosæ, apice intus uncinatæ; *corbulæ* posticæ elongatæ; *tarsi* infra spongiosi, art. basali modice elongato, tertio late bilobo, quarto elongato; *unguiculi* liberi. *Propectus* antice emarginatum. *Abdomen* segmento secundo mediocri.

The club of the antennæ is four-jointed in this genus, while in *Aclees*, to which it is allied, it is only two-jointed; it is further distinguished from that genus by its ocular lobes, emargination of the propectus, and direction of the scrobes. The latter character distinguishes it from *Hylobius*.



**SCOLITHUS ACUMINATUS.** (Pl. VII. fig. 8.) *S. oblongus*, fuscus interrupte griseo-vel albo-squamosus; capite inter oculos fovea parva impresso; rostro longitudine capitis cum prothorace, in medio tri-carinulato, carinulis supra conjunctis, squamis filiformibus, transversim sitis, omnino tecto; antennis squamis elongatis vestitis; clava brevissima, pubescente; prothorace impresso-punctato, granulis pallidioribus consperso, in medio minus squamoso; scutello curvilineatum triangulari; elytris modice convexis, prothorace multo latioribus, subparallelis, apicibus acuminatis, punctis magnis profundis seriatim impressis, triente basali regioneque suturali griseo-squamosis, triente medio, sutura excepta, fusco, vix squamoso, deinde fascia nivea et versus apicem macula fusca denudata; corpore infra pedibusque sat dense albido-squamosis. Long. 8 lin.

*Hab.* Sarawak.

**ACLEES POROSUS.** *A. oblongo-ovatus*, niger, subnitidus, omnino parce griseo-setulosus; fronte fovea elongata impressa; rostro tenuiore, prothorace cum capite longiore, confertim punctato; oculis subrotundatis; clava funiculo longitudine fere æquali, articulo basali sesquilongiore quam latiore, dense griseo-pubescente; prothorace ampliato, utrinque valde rotundato, apicem versus subtilius, reliquo mediocriter crebre punctato; scutello subcordiformi; elytris basi latioribus, lateraliter leviter rotundatis, parum convexis, haud elevatis, striato-punctatis, punctis rotundatis, modice approximatis, interstitiis convexis, callo postico minus distincto; corpore infra pedibusque nigris, parum pubescentibus; tarsis piceis pubescentibus. Long. 6-7 lin.

*Hab.* Sarawak; Batchian; Kaiou; Ceram; Morty; Bouru; Amboyna; Matabello; Ternate; Aru; Dorey; Saylee.

Allied to *A. cribratus*, Gyll., but with a longer and more slender rostrum, the club of the antennæ nearly as long as the funicle, and its basal joint considerably longer in proportion to its breadth, the punctuation generally less rugose, and the interstices of the elytra not elevated.

**ACLEES GYLLENHALLII.** *A. oblongo-ovatus*, niger, subnitidus, parce silaceo-setulosus; fronte fovea in canaliculum rostri currente; rostro prothorace vix longiore, supra subcarinato, versus apicem latiore; oculis transversis; clava funiculi longitudine dimidia, articulo basali transverso, dense griseo-pubescente; prothorace oblongo, subconico, utrinque leviter rotundato, confertim mediocriter punctato, punctis antice paulo minoribus; scutello transverso, subcordiformi; elytris modice ampliatis, subparallelis, supra parum depressis, seriatim punctatis, interstitiis tam longitudinalibus quam transversis intricato-granulatis, callo postico leviter elevato; corpore infra pedibusque nigris, nitidis, parcius squamulosis. Long. 8 lin.

*Hab.* Waigiou; Amboyna.

At once differentiated by the eyes and the sculpture of the elytra.

SELEUCA.  
(*Hylobiinae*.)

*Rostrum* validiusculum, arcuatum, supra tricarinulatum, setulis transversis munitum, utrinque ante oculum stria abbreviata notatum; *scrobes* subterminales, obliquæ, infra marginem inferiorem oculorum currentes. *Scapus* oculum attingens; *funiculus* 7-articulatus, art. duobus basalibus breviter obconicis, primo crassiore, cæteris transversis, gradatim latioribus; *clava* ovata, pubescens. *Oculi* grosse granulati. *Prothorax* oblongus, lobis ocularibus distinctis. *Elytra* ampla, oblonga, subdepressa, humeris rotundatis. *Pedes* validi; *femora* incrassata, subtus uni-tridentata; *tibiæ* sulcatæ, anticæ flexuosæ, reliquis arcuatis, apice uncinatæ; *tarsi* subtus spongiosi, art. basali triangulari, tertio bilobo, ultimo elongato; *unguiculi* liberi, divergentes. *Coxæ* anticæ haud contiguæ. *Abdomen* normale.

Among the *Hylobiinae* this genus and *Pissodes* are the only ones with the anterior coxæ not contiguous; in the latter there are no ocular lobes, and the tarsi are only partially spongy beneath. According to Mr. Wallace's note, *S. leucospila* is found on leaves.

**SELEUCA AMICTA.** (Pl. IX. fig. 7.) *S. nigra*, squamis ovatis albis interrupte vestita; rostro basi latiore et antice valde arcuato; antennis piceis; prothorace utrinque antice rotundato, apice fortiter tubulato, lateribus parallelis, supra in medio depresso, vage punctato, lateraliter niveo-figurato; scutello parvo; elytris subparallelis, striato-punctatis, dense albo-squamosis, regione suturali lateribusque maculis denudatis nigris interruptis, præcipue una communi mediana cordiformi, una obliqua laterali pone medium; corpore infra fusca, subnitida; femoribus dente valido instructis, dimidio apicali supra dense niveo-squamosis; tarsis ferrugineis. Long. 3 lin.

*Hab.* Singapore.

**SELEUCA LEUCOSPILA.** *S. nigrescens*, squamis elongatis niveis in maculas condensatis; capite rostroque castaneis, sparse niveo-squamosis, hoc fere æquilato, modice arcuato; antennis piceis; prothorace utrinque antice rotundato, pone medium subparallelo, supra vage punctato, lateraliter niveo-maculato; scutello oblongo; elytris subparallelis, striato-punctatis, maculis niveis ornatis; corpore infra

pedibusque fuscis, subnitidis; femoribus dimidio apicali supra niveo-squamosis, anticis bi-, intermediis quadri- (tribus minutis), posticis subunidentatis; tarsis fulvidis. Long. 2-2½ lin.

*Hab.* Singapore; Sarawak; Penang.

#### NIPHADES.

##### (Hylobiinae.)

*Hylobio* omnino congruit, præter *unguiculos* bifidos.

There is no other genus with bifid claws among the *Hylobiinae*; and in the allied subfamilies it is a very exceptional character. There are three well-marked species, of which two are described below; all my specimens appear to have been covered with a dull greyish crust or squamosity, in addition to ordinary scales, that seems to be easily detached, except in the punctures.

**NIPHADES PARDALOTUS.** (Pl. IX. fig. 8.) *N. oblongus, niger, opacus; rostro valido, rude sulcato-punctato, interstitiis lineas longitudinales formantibus; antennis piceis; prothorace subcylindrico, rugoso-punctato, punctis squamigeris; scutello dense squamoso; elytris prothorace multo latioribus, utrinque parallelis, leviter sulcato-punctatis, punctis rotundatis approximatis squamigeris, guttulis niveis e squamis erectis effectis sat parce adspersis; corpore infra obscure piceo; femoribus posticis versus apicem niveo-annulatis.* Long. 4-5 lin.

*Hab.* Sarawak.

**NIPHADES COSTATUS.** *N. oblongus, niger, squamositate sordide grisea indutus (nisi derasa); rostro valido, rude sulcato-punctato, interstitiis lineas longitudinales formantibus; capite prothoraceque rugosis crebre punctatis, punctis unisquamigeris, hoc subcylindrico; scutello parvo, ovato; elytris prothorace fere duplo latioribus, fortiter sulcato-punctatis, punctis minus approximatis, interstitiis uniserialiter granulatis, 3. 5. 7. tuberculato-elevatis, et fere obsolete alboguttatis, guttis e squamis erectis effectis; corpore infra pedibusque concoloribus, sub squamositate nigris, subnitidis.* Long. 4-4½ lin.

*Hab.* Aru; Batchian; Macassar.

A stouter species than the last, and differing, *inter alia*, in the sculpture of the elytra.

#### OZOCTENUS.

##### (Hylobiinae.)

*Rostrum* modice elongatum, rectum; *scrobes* præmedianæ, obliquæ, infra oculos desinentes; *scapus* oculum haud attingens; *funi-*

*culus* 7-articulatus, articulo primo crassiore, longiusculo, secundo paulo brevior, cæteris transversis; *clava* magna, ovalis. *Oculi* laterales, grosse granulati. *Prothorax* oblongus, subcylindricus, basi bisinuatus, margine inferiore antice fortiter emarginato. *Elytra* prothorace paulo latiora, elongata, parallela, basi producta, postice subito declivia; *femora* clavata, posteriora apicem elytrorum superantes, pedunculata, in medio fortiter clavata et processu triangulari denticulato munita; *tibiæ* breves, arcuatæ, compressæ; *tarsi* normales; *coxæ* anticæ parum sejunctæ. *Abdomen* segmentis duobus basalibus valde ampliatis.

The type of this genus is very like some of the smaller Australian *Orthorini*, to which, in fact, it is closely allied, differing principally in the character of the tibiæ and of the posterior femora; the latter are very remarkable, and can only be paralleled among the Tachygoninæ, a subfamily of the Aulacostethous category. From a slight difference in the rostrum I suspect my two examples are male and female.

**OZOCTENUS JUBATUS.** (Pl. IX. fig. 3.) *O. elongatus*, fuscus, griseo-squamosus; rostro prothorace brevior, squamoso; antennis subpiceis; clava longitudine funiculi æquali; prothorace utrinque paulo rotundato, supra longitudinaliter tricristato, cristis lateraliter abbreviatis, in medio sitis, intermedia alte elevata, compressa, pone medium abrupte terminata; scutello oblongo, albo-squamoso; elytris cylindricis, fortiter seriatim punctatis, interstitiis tertio quintoque elevatis, granulatis et basin versus cristatis, apice albido-squamosis; corpore infra nigro, subnudo; pedibus griseo-squamosis; tibiis posticis valde arcuatis, prope basin angulato-dilatatis. Long.  $2\frac{1}{2}$ –3 lin.  
*Hab.* Amazons (Ega).

**DICORDYLUS PUPILLATUS.** (Pl. VI. fig. 1.) *D. ferrugineus*, nitidus, subtus pube alba variegatus; prothorace subconico, subtiliter punctato, septemvittato; elytris postice sensim angustioribus, sat crebre irregulariter punctatis, lineis interruptis ochraceis basi apiceque ornatis, singulis medio annulo niveo conspice notatis. Long. 6 lin.

*Hab.* Chili.

The diagnoses of this and the following species are drawn up to contrast with the two described by Lacordaire. In this species, which approximates to *D. heilopoides*, the elytra are gradually narrowed to the apex, which is deeply and angularly emarginate, with the outer angle on each side rather produced; the femora



are longer and more clavate, especially the posterior, and mutic beneath; the anterior and intermediate tibiæ are straight, and the posterior very strongly curved; the white ring on each elytron is very marked, but an approach to this is observable in some individuals of *D. heilopoides*.

**DICORDYLUS LUCTUOSUS.** *D. ater*, undique pube erecta, setis interjectis, vestitus, maculisque parvis, e squamositate ochracea formatis, obscure irroratus; prothorace subconico, lateribus medio rotundato-ampliato; scutello elevato; elytris crebre punctatis, antice transversim rugosis, tuberculis plurimis atro-fasciculatis munitis, singulis pone medium fascia nivea decoratis. Long.  $7\frac{1}{2}$  lin.

*Hab.* Chili.

This species differs from *D. ithyceroides*, *inter alia*, in being much stouter in all its parts; in the third joint of the antennæ being nearly as long as the two next together, and in the four terminal joints being shorter and broader; the apex of each elytron is obliquely emarginate within; in *D. ithyceroides* there is only a single fascicle at the base on each side, and there is no ochraceous powdery substance on the elytra, the tibiæ are much thickened at the apex, and in both species the middle of the tibiæ is covered with white hairs.

**DICORDYLUS AMENUS.** *D. ovatus*, purpureo resplendens; capite rostroque lineatim, elytris maculatim ochraceo-pubescentibus; rostro brevi, nigro; antennis rufo-testaceis, fusco-variis; prothorace transversim conico, crebre punctato, quinquevittato; scutello semiorbiculari; elytris depressis, humeris rotundatis, singulis subcarinatis, apice in medio fortiter mucronatis, maculis magnis in seriebus tribus ornatis; corpore infra chalybeato, nitido, ad latera pube ochracea variegato; pedibus parce pilosis, rufo-testaceis, tarsis fuscis. Long.  $3\frac{1}{2}$  lin.

*Hab.* Chili.

This is a somewhat aberrant species.

#### AGILAEUS.

(*Rhinomacerinae*.)

*Rhynchitæ* affinis, sed tibiis compressis, subfoliaceis; et pygidio obtecto.

The remarkable form of the tibiæ essentially differentiates this genus from *Rhynchites*. In other characters, except of the pygidium, it agrees with the description as given by Lacordaire; the granulate surface of the derm, however, is foreign to *Rhyn-*

*chites*; it may be added that the basal joint is scarcely thicker than the second.

**AGILAUUS PEDESTRIS.** (Pl. VII. fig. 11.) *A. oblongus*, supra niger, nitidus, granulatus, squamulis filiformibus rufo-ferrugineis inter granula repletus; capite confertim granulato; rostro subtenuato, arcuato, prothorace cum capite paulo longiore, in medio carinulato, basi subreticulato-punctato, versus apicem punctis magis dispersis; scrobibus præmedianis, breviusculis; antennis ferrugineis, funiculo art. primo secundo longiore, cæteris ad quantum primo æqualibus, duobus ultimis brevioribus; prothorace modice convexo, utrinque sat fortiter rotundato, apice angustiore, vage granulato; scutello transverso; elytris prothorace multo latioribus, basi incurvatis, apicibus rotundatis, striato-punctatis, interstitiis vage inæqualiter granulatis; corpore infra fusco, ferrugineo-piloso; femoribus subgranulatis; tibiis confertim punctatis, lateribus costatis; tarsis breviusculis, latis, ferrugineo-pilosis. Long. 4 lin.

*Hab.* Sarawak.

### ECTYRSUS.

#### (Prionomerinæ.)

*Caput* rotundatum, inflexum; *rostrum* subtenuatum, cylindricum, arcuatum; *scrobes* obliquæ. *Oculi* magni, sat grosse granulati, antice contigui. *Antennæ* præmedianæ; *scapo* breviusculo; *funiculo* 7-articulato, art. basali elongato, crasso, secundo multo minore, reliquis brevibus; *clava* perampla, elongato-ovata, art. ultimo excepto, laxè articulata. *Prothorax* subtransversus, convexus, utrinque rotundatus, basi basinuatus, lobis ocularibus parvis, distinctis, infra margine antico profunde emarginato. *Elytra* prothorace multo latiora, convexa, suboblonga, apice late rotundata. *Femora* antica perampla, subtus dente magno triangulari crenulato instructa, altera minus incrassata, dente parvo armata; *tibiæ* anticæ valde arcuatæ, apice acuminatæ, intermediæ et posticæ fere rectæ, uncinatæ; *tarsi* art. basali elongato, tertio bilobo; *unguiculi* parvi, simplices, approximati. *Abdomen* segmento secundo duobus sequentibus conjunctim brevior.

The exponent of this genus is a remarkably hairy little insect, closely allied to *Prionomerus*, Schön., but with the eyes contiguous above, the fore tibiæ acuminate and without a hook at the apex, and the prothorax with ocular lobes and deeply emarginate beneath for the reception of the base of the rostrum, the

latter, in repose, lying between the coxæ. The claws seem to be slightly united at the base.

**ECTYRSUS VILLOSUS.** (Pl. VII. fig. 5.) *E. niger*, nitidus, pilis longissimis erectis albidis, nigris intermixtis, sat dense vestitus; rostro prothorace paulo longiore, lateraliter sulcato; antennis flavidis; funiculo art. basali quatuor sequentibus simul sumptis longitudine æquali; prothorace pone medium paulo angustiore; scutello oblecto; elytris fortiter sulcato-punctatis, interstitiis latis; corpore infra femoribus tibiisque anticis nigris nitidis, reliquis tibiarum tarsisque læte flavidis. Long.  $1\frac{2}{3}$  lin.

*Hab.* Brazil (Rio).

#### OMPHASUS.

##### (Prionomerinæ.)

*Caput* exsertum, subporrectum. *Rostrum* validiusculum, subcylindricum, paulo arcuatum; *scrobes* præmedianæ, obliquæ. *Oculi* parvi, rotundati, haud approximati. *Antennæ* tenues; *scapo* sensim incrassato, oculum haud attingente; *funiculo* sexarticulato, art. duobus basalibus breviter obconicis, primo crassiore, cæteris transversis; *clava* ovata adnata. *Prothorax* subconicus, antice truncatus, basi bisinuatus. *Scutellum* parvum. *Elytra* oblonga, modice convexa, singulo basi sinuato, humeris calloso-rotundatis. *Pygidium* oblectum. *Pedes* validi, antici majores; *femora* incrassata, subtus dentata; *tibiæ* anticæ arcuatæ, apice extus unco valido armatæ; *tibiæ* intermediæ et posticæ rectæ, illæ uncinatæ; *tarsi* art. basali elongato-triangulari, secundo parvo transverso, tertio peramplo, profunde bilobo, ultimo elongato; *unguiculi* liberi, singulo dente triangulari munito. *Metasternum* sat clongatum. *Epimera* metathoracis angusta. *Abdomen* segmentis subæqualibus, tribus intermediis ad latera angulatis.

The genera of the *Prionomerinæ* have hitherto been supposed to be confined to America; but this genus, and the following, discovered by Mr. Wallace, rendered it probable that many more species may yet be found in the Malayan archipelago. It is differentiated from the ordinary members of the subfamily in its nearly porrect head, the oblique scrobes, the six-jointed funicle, and the non-approximation of the eyes; in habit it is like some species of *Magdalis*, Germ. (The artist has unfortunately drawn the outline of the head in a vertical position.)

**OMPHASUS ÆRATUS.** (Pl. VII. fig. 12.) *O. oblongus*, fusco-æneus,

pube subtilissima grisea sparse vestitus; rostro reticulato-punctato, fere obsolete tricarinato, apicem versus paulo latiore; antennis fuscis, clava dense griseo-pubescente; prothorace oblongo, utrinque parum rotundato, crebre rugoso-punctato, antice læviore, indumento terreo in cavitatibus munito; scutello rotundato; elytris prothorace multo latoribus, longitudine sesquialioribus, oblongo-quadratis, apice late rotundatis, striato-punctatis, punctis profunde impressis, interstitiis parcius uniseriatim subtilissime granulatis, interstitio quinto postice tuberculato-elevato; corpore infra pedibusque fuscis, subnitidis; femoribus anticis peramplis, dente magno triangulari instructis. Long.  $5\frac{1}{2}$  lin. (rost. incl.).

*Hab.* Sarawak.

#### ZEIONA.

##### (Prionomerinæ.)

*Caput* deflexum; *rostrum* validiusculum, arcuatum; *scrobes* præmedianæ, obliquæ, fere infra oculos desinentes. *Oculi* magni, ovales, antice approximantes. *Scapus* clavatus; *funiculus* 6-articulatus, articulo primo crassiore, secundo longiore, cæteris breviusculis; *clava* magna, ovata. *Prothorax* transversus, subconicus, basi rotundatus. *Scutellum* distinctum. *Elytra* modice convexa, perampla, utrinque valde rotundata. *Pedes* antiqui majores; *femoribus* valde incrassatis infra spina acuta armatis; *tibiisque* arcuatis, apice obsolete uncinatis; *tarsi* normales; *unguiculi* liberi, appendiculati. *Pectus* brevissimum. *Metasternum* breve. *Abdomen* segmentis duobus basalibus modice ampliatis. *Processus* intercoxalis latus, subtruncatus.

In habit and in many of its characters this genus is widely different from the last; in that respect, and in the delicacy of its structure and coloration, it is the most aberrant of its subfamily. It will be noted that both genera have a six-jointed funicle; (the artist has given seven, and has not made the first nearly as large as it should have been).

**ZEIONA PULCHELLA.** (Pl. VII. fig. 6.) *Z.* pallide flavescens; capite rostroque fere obsolete punctatis, hoc prothorace parum brevior; oculis nigris, prominulis; antennis omnino sordide fulvis; prothorace parum tubulato, utrinque paulo rotundato, basi multo latiore, supra vage indistincte punctato; scutello curvilineatim triangulari; elytris breviter ovatis vel subrotundatis, subviolaceis, apice flavescens, subtiliter albido-pubescentibus, striato-punctatis, punctis leviter impressis, interstitiis latis, vix convexis, uniseriatim albido-setulosis; corpore infra pedibusque fere albescentibus. Long.  $1\frac{1}{2}$  lin.

*Hab.* Sarawak.



**LÆMOSACCUS NOTATUS.** (Pl. VI. fig. 4.) *L. latiusculus*, fuscus; rostro modice elongato, paulo arcuato, piceo; oculis sat magnis, subovatis, transversis; antennis rufo-testaceis; funiculo breviusculo, articulo primo quam secundo vix sesquolongiore, cæteris brevissimis; oculis supra approximatis; prothorace creberrime punctulato, lobo scutellari vittaque laterali silaceo-pubescentibus, illo acuminato; scutello fusco, valde transverso, quasi bilobo; elytris fusco-ferrugineis, striato-punctatis, interstitiis planatis, leviter rugoso-granulatis, plaga basali circa scutellum maculaque singulatim apicali pube læte silacea decoratis; corpore infra dense griseo-squamoso; pedibus ferrugineis. Long. 3 lin.

*Hab.* Queensland (Wide Bay); King George's Sound.

A species with short, but not broad elytra, as in the next, and with a well-marked yellow patch around the scutellum, and two spots of the same colour near the apex.

**LÆMOSACCUS ELECTILIS.** *L. brevis*, supra pedibusque fusco-vinosus; rostro brevi, fusco, basi fortiter rugoso-punctato; antennis rufo-testaceis, funiculo articulo primo quam secundo triplo longiore; oculis supra modice approximatis; prothorace creberrime punctulato, lobo scutellari apice rotundato, linea angusta basali lateribusque albedo-pubescentibus; scutello rotundato, fusco; elytris brevibus, striato-punctatis, interstitiis planatis, rugoso-granulatis, plaga conspicua circa scutellum, maculisque paucis obscuris albedo-pubescentibus ornatis; corpore infra nigro, squamis albis, lateribus exceptis, vestito. Long.  $3\frac{1}{2}$  lin.

*Hab.* Australia.

A short broad species, with a small round scutellum placed in a hollow between the elytra.

**LÆMOSACCUS CATENATUS.** *L. breviusculus*, fuscus, silaceo-pubescent; rostro medioeri, nitido, omnino subvage punctulato; antennis rufo-testaceis; funiculo articulo primo quam secundo duplo longiore; oculis magis approximatis; prothorace creberrime punctulato, dorso pube sparse, lateribus densius vestito, maculisque quatuor silaceis, aliquando fere obsoletis, notato, duabus anticis, duabus posticis sitis; scutello rotundato; silaceo; elytris rufo-brunneis, striato-punctatis, interstitiis rugoso-granulatis, fascia maculata silacea pone medium alteraque apicali ornatis; corpore infra nigro, griseo-pubescente; pedibus rufo-brunneis. Long.  $3\frac{1}{3}$  lin.

*Hab.* Queensland (Wide Bay).

This is also one of the broader species; but the elytra are proportionally longer than the last and differently coloured.

**LÆMOSACCUS PECCUARIUS.** *L. oblongus*, rufo-ferrugineus, parce

silaceo-pubescentibus; rostro brevi, recto, confertim oblongo-punctato; antennis rufo-testaceis, scapo longiore, in medio curvato; funiculo articulo primo quam secundo paulo longiore; clava minuscula; prothorace crebre punctato, antice manifeste longitudinaliter lineatim sulcato, lobo mediano lateribusque sat dense silaceo-pubescentibus; scutello transverso, utrinque rotundato; elytris prothorace haud latioribus, striato-punctatis, leviter rugoso-granulatis, dorso pubescentibus sat dense vestitis; corpore infra pube grisea sat dense tecto; pedibus rufo-brunneis. Long. 3 lin.

*Hab.* South Australia (Adelaide).

An oblong dark species, something like *L. subsignatus*, but with longer elytra in proportion to the prothorax, and the figuration nearly obsolete.

**LÆMOSACCUS USTULUS.** *L. suboblongus*, niger; rostro brevi, recto, confertim oblongo-punctato; oculis prominulis; antennis rufo-testaceis; scapo in medio curvato; funiculo articulo primo valde incrassato, secundo vix brevior; clava majuscula; prothorace creberrime punctulato, apice tubulato, antice paulo excavato, lobo mediano lateribusque griseo-pubescentibus; scutello subtransverso, glabro; elytris parum nitidis, striato-punctatis, interstitiis rugoso-granulatis, præsertim postice, regione scutellari sat dense griseo-pubescentibus; corpore infra crebre punctato; tibiis aliquando subferrugineis. Long.  $1\frac{2}{3}$  lin.

*Hab.* Adelaide (Melbourne).

A small nearly black species, in outline like *L. notatus*, but with a short rostrum and very prominent round eyes.

**ALCIDES MAGISTER.** (Pl. IX. fig. 9.) *A. oblongus*, niger, ubique dense albido-squamosus, fusciscentibus variis, granulisque parvis depressis adpersus; capite porrecto; rostro prothorace sesquilongiore, paulo arcuato, pallide fusciscentibus-squamoso; funiculo articulo secundo quam primo duplo longiore; clava articulo basali obconico; oculis subrotundatis; prothorace conico elytrisque basi saturate fusciscentibus, in medio carinulato; scutello parvo, rotundato; elytris basi prothorace paulo latioribus, humeris rotundatis, lateribus sensim angustioribus, striatis, interstitiis subconvexis; corpore infra pedibusque squamis niveis interjectis; tibiis intermediis et posticis in medio intus haud angulatis. Long. 12 lin.

*Hab.* Aru.

One of the finest of the Curculionidæ, and without any obvious affinity to any known species. *Alcides*, of which I have above ninety species, is full of isolated forms; but the ordinary generic characters are insufficiently supported by habit, and, without a large number of new genera, could not be satisfactorily used in

dividing the genus as it stands at present. *Alcides* is well represented in the Papuan group—about twelve species—while in Australia it is all but unknown; there are numerous species from West and from South Africa, one from the north of Persia, and another, described further on, from North China; and these two probably indicate the northern limits of the genus.

**ALCIDES FASTUOSUS.** *A. breviter subcylindricus*, squamositate sordide silacea sparse vestitus; rostro valido, prothorace longiore, dimidio basali squamoso, reliquo breviter punctato; antennis nigris, remote setulosis; funiculo articulo secundo quam primo longiore, cæteris brevibus, submoniliformibus; oculis rotundatis; prothorace subconico, utrinque paulo rotundato, supra granulato; scutello subquadrato albo-squamoso; elytris basi prothorace paulo latioribus, latitudine vix duplo longioribus, fortiter sulcato-punctatis, punctis oblongo-quadratis, interstitiis granulatis, pone medium fascia lata conspicua apiceque albido-squamosis; corpore infra pedibusque sparse griseo-squamosis, granulatis; tibiis anticis dente parvo, reliquis intus subbisinuatis. Long. 8 lin.

*Hab.* Sarawak.

A very distinct species, the declivity of the elytra not marked with a callosity as in most others of this genus.

**ALCIDES AURITUS.** (Pl. IX. fig. 11.) *A. subcylindricus*, ater, squamositate sparsa nigra indutus, squamisque albidis plagiatis decoratus; capite verticali, inter oculos fovea profunda impresso; rostro crasso, prothorace brevior, sat crebre punctato, squamis brevissimis albis adperso; antennis nigris, fere nudis; funiculo articulo basali breviusculo, cæteris transversis; oculis ovalibus; prothorace haud transverso, antice modice angustiore, utrinque rotundato, apice excepto, sat confertim verrucoso-grulato; scutello atro; elytris pone humeros tuberculo conico valido instructis, supra fortiter sulcato-punctatis; corpore infra nigro, albo-plagiato; pedibus squamis filiformibus griseis adpersis; tibiis intus in medio spinoso-dentatis. Long. 5 lin.

*Hab.* Cochinchina.

This species may be placed near *A. delta*. The coloration is very complicated, as will be seen on the Plate, and is not always exactly the same. The spots on the white patches represent the punctuation.

**ALCIDES ERRO.** *A. subcylindricus*, ferrugineus, prothorace nigro, utrinque albido-lanuginoso; rostro sat valido, prothorace sesquilongiore, rude confertim punctato; antennis fuscis, funiculo articulis duobus basalibus longioribus, cæteris brevibus, ultimis transversis; clava ampliata; oculis subovatis; prothorace transverso, confertim

granulato; scutello punctiformi; elytris prothorace haud latioribus, fortiter seriatim punctatis, punctis magnis quadratis, squamositate sparsa silacea munitis, interstitiis angustis, transversis elevatis; corpore infra pedibusque ruguloso-punctatis, sparse squamosis; coxis anticis manifeste sejunctis; tibiis intermediis et præsertim posticis brevibus, intus obsolete bisinuatis. Long. 4 lin.

*Hab.* China.

Probably most nearly allied to *A. lacunosus*, but differentiated by the unicolorous elytra and the woolly sides of the prothorax. Mr. Arthur Adams has also found this species in one of the islands of the Japanese seas.

**ALCIDES MICRONYCHUS.** *A. ovatus*, niger, lineatim grisescenti-squamosus; capite verticali; rostro valido, prothorace brevior, sat crebre punctato; antennis nigris, fere nudis; funiculo articulis brevibus, ultimis transversis; oculis ovatis; prothorace transverso, apice multo angustiore, utrinque rotundato, rude punctato, fascia mediana, ad latera ampliata, vittaque postice pallide griseo-squamosis; scutello nigro; elytris prothorace latioribus, antice valde productis, sulcato-punctatis, interstitiis rugosis, fascia arcuata pone medium vittisque quatuor anticis griseis; corpore infra sejuncte griseo-squamoso; abdomine segmentis tribus intermediis subæqualibus; pedibus rude confertim punctatis, punctis unisquamigeris; tibiis intus haud angulatis; tarsis articulo tertio ampliato-rotundato, quarto brevi. Long.  $2\frac{3}{4}$  lin.

*Hab.* Cochinchina.

Remarkable for the large round penultimate joint of the tarsi, the claw-joint inserted on the middle and barely extending beyond it.

**ALCIDES FRONTALIS.** *A. elongatus*, cylindricus, ferrugineus postice pallidior, tenuiter parce pilosus; capitis fronte rostroque supra dense albido-squamosis et pilosis, hoc breviusculo, valido; antennis subferrugineis, funiculo articulo secundo longiore; cæteris transversis; clava breviter ovata; oculis ovalibus; prothorace oblongo, fortiter punctato-impresso, lobis ocularibus obsoletis; scutello rotundato; elytris prothorace paulo latioribus, parallelis, postice sat subito declivibus, seriatim punctatis, punctis ampliatis, oblongis, interstitiis (præsertim antice) subtuberculatis, elevatis; pedibus fulvo-brunneis, tenuatis; tibiis intus integris; unguiculis connatis, haud bifidis; coxis anticis contiguis. Long. 4-7 lin.

*Hab.* Morty; Batchian.

An odd-looking species, quite *sui generis* in *Alcides*, but having some resemblance to *Hypermetra analis* (*ante* p. 167), although with the habit of *Pæpalosomus*, to the neighbourhood of which I am almost tempted to refer it, notwithstanding its 6-jointed



funicle. Like some others of the genus, its claws are simply united at the base and not appendiculate or divided. No two Curculionids could be much more unlike than this and the last.

### GLECHINUS.

#### (Cryptorhynchinæ.)

*Caput* sphaericum; *rostrum* breve, rectum, nudum; *scrobes* præmedianæ, laterales, oculos attingentes. *Scapus* 7-articulatus; articulis duobus basalibus longioribus, cæteris transversis, gradatim latoribus; *clava* ovata, adnata. *Oculi* laterales, prothorace liberi, grosse granulati. *Prothorax* subconicus, apice tubulatus, haud productus, basi late emarginatus, angulis posterioribus paulo productis. *Scutellum* triangulare. *Elytra* subcylindrica, apice rotundata. *Pedes* breves; *femora* incrassata, infra dente parvo instructa; *tibiæ* compressæ, fere rectæ, apice latiores, angulo interiore dentiformi, intermediæ angulo exteriori etiam producto, omnes unco mediocri armatæ; *tarsi* normales. *Coxæ* anticæ distantes. *Propectus* solum modice excavatum. *Prosternum* detectum. *Mesosternum* declive. *Abdomen* normale.

This genus may be regarded as the representative in New Caledonia of the New Zealand *Psepholax*. From that genus it is differentiated, *inter alia*, by its straight scrobes and declivous mesosternum not covering the prosternum. The structure of the intermediate tibiæ is evidently a modification of that of *Psepholax*.

**GLECHINUS TALPA.** *G. elliptico-cylindricus*, læte fuscus, squamis ochraceis maculatim ornatus; rostro piceo, subtiliter punctato; scapo supra versus apicem longe et dense ciliato, funiculo intus parcius ciliato; clava articulis tribus ultimis valde pubescentibus; prothorace indistincte punctato, linea media plagisque duabus utrinque ochraceis; elytris striato-punctatis, interstitiis convexis, maculis ochraceis irregulariter adpersis; corpore infra sat dense griseo-squamoso; pedibus squamis minusculis tectis, setulis numerosis interjectis. Long.  $3\frac{1}{4}$  lin. *Hab.* New Caledonia.

### DERETIOSUS.

#### (Cryptorhynchinæ.)

*Rostrum* gracile, capite duplo longius, subarcuatum, dimidio apicali nudo; *scrobes* præmedianæ, infra rostrum cito euntes.

*Oculi* sat magni, laterales. *Antennæ* ante medium rostri insertæ; *scapus* clavatus, oculum vix attingens; *funiculus* 7-articulatus, art. primo crasso, secundo longiore, cæteris in clavam continuatis; *clava* elliptica, obsolete articulata. *Prothorax* transversus, apice productus, lateraliter lobatus, basi bisinuatus, lobis ocularibus productis. *Scutellum* distinctum. *Elytra* prothorace latiora, depressa, inæqualia, parallela, basi trisinuata, postice sensim declivia, humeris prominulis. *Pedes* breves; *femora* infra unidentata; *tibiæ* breves, intus bisinuatæ, unco terminatæ; *tarsi* mediocres, art. tertio lobato, ultimo elongato. *Rima* pectoralis indeterminata, metasterno impingens. *Mesosternum* depressum, antice verticale. *Abdomen* normale, sutura prima arcuata, cæteris haud angulatis.

Like *Bothrobatys* in habit; but from its pectoral canal open at the sides and impinging on the metasternum, the genus must be placed with Lacordaire's "Ithyporides;" but it does not seem to be allied to any of the genera in that group. In general appearance the species described above resembles the Australian *Chimades lanosus*, Pasc.

**DERETIOSUS ARIDUS.** (Pl. VIII. fig. 10.) *D. fusca*, squamositate albida omnino dense tecta; rostro ferrugineo, apicem versus nitido, subtiliter punctato; antennis pallide ferrugineis, leviter pubescentibus; prothorace supra fere planato, utrinque lobo ampliato horizontali subdilato, hoc margine anteriore squamoso-fasciculato; scutello punctiformi, elevato; elytris pone basin elevatis, singulo in medio dorsi longitudinaliter cristato, cristis in duas fere divisas, fasciculisque squamosis coronatis, apicibus paulo productis, conjunctim rotundatis. Long. 4 lin.

*Hab.* Dorey; Saylee (New Guinea); Ceram.

**MITREPHORUS CAPUCINUS.** *M. oblongus*, cylindricus, fuscus, rude griseo-squamosus, capite rostroque squamis majusculis tectis, hoc apice nigro; antennis testaceis; prothorace antice valde producto, apice ipso squamis flavescentibus elongatis dense fimbriato et in modo radiato, etiam infra dense squamoso, supra sejuncte punctato, puncto singulo squama repleto: scutello ochraceo-squamoso; elytris squamis parvis densissime tectis, leviter striato-punctatis, ad latera squamis majusculis nigris parcius adspersis; pedibus dense squamosis, squamis numerosis erectis interjectis; tarsis potius pilosis. Long. 3 lin.

*Hab.* Brazil.

**MITREPHORUS ALBIFRONS.** *M. oblongus*, cylindricus, fuscus, dense griseo-squamosus; capite antice niveo-squamoso; antennis subtectis; prothorace apice ultra caput vix producto, squamis elongatis sparse adpersis, in medio fasciculis duobus fuscis instructo; scutello concolori; elytris striato-punctatis, interstitiis alternis elevatis, squamis erectis uniseriatim munitis; pedibus rufo-brunneis, dense squamosis, squamis erectis interjectis. Long. 2 lin.

*Hab.* Brazil.

*M. Waterhousei*, the only other species, is a larger insect, and covered with a very dense greyish crust.

### PERICHIUS.

*Rostrum* robustum, reticulato-punctatum, punctis squamigeris, apice paulo dilatatum; *scrobes* subterminales, laterales. *Scapus* compressus, oculum attingens; *funiculus* 1-articulatus, art. primo longiore, secundo breviusculo; *clava* anguste ovata, adnata. *Oculi* grosse granulati. *Prothorax* amplus, supra convexus, antice tubulatus, lobis ocularibus angustis. *Scutellum* nullum. *Elytra* late ovata, convexa, humeris obsoletis. *Pedes* modice elongati; *femora* sublinearia, mutica; *tibiæ* flexuosæ, æquilatæ; *tarsi* mediocres, art. tertio late bilobo. *Rima pectoralis* pone coxas anticas limitata, apice cavernosa\*. *Epi-sterne* metathoracis obtecta. *Abdomen* normale; *sutura* prima arcuato-angulata.

Allied to the South-American genus *Tylodes*, Schön. (and in habit like *T. tuberculatus*), but differentiated by the *scrobes*, sculpture of the rostrum, and form of the *tibiæ*.

**PERICHIUS VERRUCOSUS.** (Pl. VIII. fig. 9.) *P. ovatus*, niger, omnino sat dense ochraceo-squamosus, supra granulis nitidis setigeris dispersis; rostro capite duplo longiore, fusco opaco, ad latera densius squamoso, apice paulo spatulato; antennis ferrugineis, funiculo haud pubescente, parce setoso, art. quinque ultimis subquadratis, clava art. basali cæteris conjunctim longiore; prothorace inæquali, antice fortiter tubulato, utrinque ampliato-rotundato, basi angustiore, parte anteriore haud granulato sed squamis elongatis sat dense vestito; elytris prothorace basi haud latioribus, deinde paulo ampliatis, utrinque rotundatis, supra seriatim subfoveatis, interstitiis granulatis, alternis interrupte elevatis, apice rotundatis; pedibus sat dense setosulis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Waigiou.

\* This term is intended to include that form of the pectoral canal in which the apex is covered by the raised margin of the mesosternum, whether the margin be vaulted or semicircular—the converse of when it is exposed (*aperta*).

## EREBACES.

*Rostrum* tenue, apice paulo dilatatum, dimidio apicali nudum, nitidum; *scrobes* medianæ, laterales. *Scapus* oculum haud attingens; *funiculus* 7-articulatus, art. duobus basalibus longiusculis, primo brevior; *clava* breviter ovata, adnata. *Oculi* majusculi, tenuiter granulati. *Prothorax* apice paulo productus, supra subplanus, lateraliter compressus, lobis ocularibus angustis. *Elytra* prothorace arcte applicata, supra planata, postice declivia, pone humeros angulato-producta. *Pedes* elongati; *femora* linearia; *tibiæ* rectæ, æquilatæ; *tarsi* subelongati, art. tertio late bilobo. *Rima* pectoralis inter coxas intermedias protensa, apice aperta. *Episterna* metathoracis angusta, distincta. *Abdomen* segmento secundo breviusculo, duobus sequentibus conjunctim vix æquali; *sutura* prima recta.

The two species composing this genus are quite distinct in habit, owing to the peculiar shape of the elytra, from any other *Tragopus*-form, although, in some respects, a little like *Hexymus*, but differing in their finely faceted eyes and pectoral canal open at the apex.

EREBACES ANGULATUS. (Pl. VIII. fig. 8.) *E. oblongus*, niger, omnino silaceo-squamosus; rostro ferrugineo, vage punctulato; antennis ferrugineis, funiculo clavaque pubescentibus, illo parce nigro-setoso; prothorace subquadrato, antice constricto, supra remote punctato, punctis squamigeris, in medio tuberculis duobus obsito, angulis posticis productis, rotundatis; scutello distincto; elytris quadrato-cordatis, vage nitide granulatis, supra seriatim foveatis, singulatim tuberculo basali elevato oblongo, altero postico multo majore, tertioque minore laterali, instructis, angulo humerali producto, nigro-marginato, apicibus rotundatis; pedibus sat dense setosulis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Batchian.

EREBACES PLEURICAUSTA. *E. oblongus*, piceus, supra dense silaceo-, infra pedibusque fusco-squamosus; rostro ferrugineo vage punctulato; antennis piceis, funiculo clavaque ut in *E. angulato*; prothorace suboblongo, utrinque antice rotundato, postice parallelo, supra fusco-marginato, punctis remotis, squamis repletis, impresso; scutello obsoleto; elytris subcordatis, striato-punctatis, interstitiis latis, prope suturam uniseriatim granulatis, angulo humerali producto, fere obsolete nigro-marginato, apicibus rotundatis, in singulo elythro tuberculo basali oblongo, altero postico majore, tertioque laterali instructo; pedibus sat dense setosulis. Long. 5 lin.

*Hab.* Morty.



## HEXYMUS.

## (Cryptorhynchinæ.)

*Rostrum* modice tenuatum, arcuatum, dimidio apicali nudo, nitido; *scrobes* laterales; *antennæ* medio rostri insertæ; *scapo* longiusculo; *funiculo* 7-articulato, art. duobus basalibus elongatis, tertio obconico, cæteris ovatis; *clava* ovali. *Oculi* grosse granulati. *Prothorax* transversus, apice valde angustior, utrinque rotundatus. *Elytra* subquadrata, apice declivia. *Femora* modice incrassata, infra dente angulato armata; *tibiæ* flexuosæ, apice tenuiores, uncinatæ; *tarsi* art. tertio angusto, bilobo. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Episterna* metathoracis angusta, distincta. *Abdomen* normale; *sutura* prima recta.

This is one of those genera which, without any strong characters, must be constituted partly on account of their peculiar habit, and partly because their characters collectively are not in accord with those of any other genus. It is apparently allied to *Poro-pteris*, although the metathoracic episterna are very large.

HEXYMUS TUBEROSUS. (Pl. VII. fig. 3.) *H. oblongus*, fuscus, indumento griseo dense omnino tectus, squamisque subsilaceis adspersus; capite fronte convexo, inter oculos foveato; rostro capite plus duplo longiore, subtenui, apice depresso, fusco, extrorsum subtilissime punctulato, basi rugoso-squamoso; antennis ferrugineis; funiculo art. duobus basalibus primo plus duplo longiore, cæteris modice elongatis, ultimo obconico, clavæ subadnato; prothorace transverso, utrinque rotundato, antice constricto, apice producto, lobis ocularibus subangustis, supra pone medium bicalloso, ad apicem crista cariniformi munito; scutello distincto; elytris basi prothorace latioribus, subcompressis, lateribus parallelis, postice declivibus, supra seriatim granulatis, singulo callis oblongis quatuor bene determinatis notato—duobus discoideis ad suturam approximantibus, duobus lateralibus, quorum postico in declivitate sito: pedibus squamis elongatis magis dispersis. Long. 4 lin.

*Hab.* Queensland.

The following species of *Poro-pteris* may be taken as fairly congeneric with the four described by Mr. Waterhouse in the 'Transactions of the Entomological Society' (ser. 2, ii. pp. 196–200); but they do not seem to range very satisfactorily in the genus when we consider it has *P. antiquus* for its type. I have yet some twenty approximate species; and until they are worked

out I take the genus as it stands at present. I follow Mr. Waterhouse in dividing it into two sections, depending on the relative length of the two basal joints of the funicle; but this is an artificial arrangement, as it separates *P. verres* from *P. morbillosus*.

Section I. *Second joint of funicle longer than the first.*

**POROPTERUS EXITIOSUS.** *P. sat late ovatus, subdepressus, niger, parce pallide brunneo-squamosus; capite inter oculos fovea parva impresso; rostro robusto, sat elongato; oculis subtenuè granulatis; antennis longioribus, versus apicem rostri insertis; funiculo art. secundo primo plus sesquilingiore, cæteris ovatis; clava ovali; prothorace supra subplanato antice subtriangulari, apice bifido, utrinque vix rotundato, basi incurvato, tuberculis quatuor parvis fasciculatis pone medium transversim obsito; scutello minuto; elytris prothorace latioribus modice convexis, postice subito declivibus, humeris valde calloso-productis, remote fortiter punctatis, singulo tuberculis quinque majusculis conicis—quatuor prope suturam, alioque extimo inter secundum tertiumque, sitis, tuberculisque minusculis lateraliter uniserialiter instructis, apice late rotundatis extus tuberculo parvo munito; corpore infra pedibusque vage setuloso-squamosis. Long. 7 lin.*

*Hab. Queensland.*

A broad species, rather depressed above, or only slightly convex.

**POROPTERUS ELLIPTICUS.** *P. oblongo-ovatus, niger, griseo-squamosus; rostro sat elongato; oculis tenuiter granulatis; antennis fusco-piceis, funiculo art. secundo primo fere sesquilingiore; clava ovali; prothorace subconico, sat elongato, haud tuberculato, apice bifido, in medio carina elevata instructo; elytris prothorace paulo latioribus, utrinque rotundatis, pone medium modice elongatis, gradatim in apices attenuato-productis, supra disperse impresso-punctatis, tuberculis plurimis serialiter dispositis, seriebus alternis tuberculis majoribus instructis; corpore infra pedibusque squamis adpressis vestitis. Long. 6–7 lin.*

*Hab. New South Wales (Illawarra).*

Allied to *P. chevrolatii*, Waterh., but narrower, more elliptic, and the elytra drawn out posteriorly; the carina on the prothorax is very marked and apparently always without scales.

**POROPTERUS WATERHOUSII.** *P. angustatus, nigrescens, sat parce subsilaceo-squamosus, squamositate concolori dense tectus; rostro longiusculo; oculis subtenuiter granulatis; antennis piceis; funiculo art. secundo primo fere triplo longiore; prothorace oblongo, gibboso, antice abrupte constricto, utrinque in medio rotundato, basi angustiore, supra antice tricarinato, medio tuberculis rugosis quatuor*

transversim obsito, pone medium granulato; scutello semicirculari; elytris prothorace in medio vix latioribus, compressis, humeris productis, supra grosse granulatis, singulatim triseriatim tuberculatis—serie interiore tribus, intermedio duobus, exteriori etiam duobus minusculis, obsitis, tuberculo conico majusculo apicali, alteroque apice ipso, munitis, lateribus profunde punctatis, punctis setigeris; corpore pedibusque subvage silaceo-squamosis, tibiis setulosus. Long. 7 lin.

*Hab.* Queensland.

Allied to *P. Jekeli*, Waterh., but longer and proportionally narrower; the second joint of the funicle much longer, &c.

**POROPTERUS MORBILLOSUS.** *P.* sat angusto-ovatus, niger, squamis elongatis pallide fuscis plus minusve tectus; capite rostroque rugoso-squamosis, hoc haud carinato; oculis subtenuiter granulatis; antennis piceis; funiculo art. secundo primo sesquilongiore; prothorace haud granulato, latitudine vix longiore, antice modice contracto, utrinque sat fortiter rotundato, supra subsilaceo, in medio 4-tuberculato, tuberculis depressis, aliquando fere obsoletis, approximatis, duobus posticis majoribus; elytris compressis, subovatis, prothorace paulo latioribus, postice vix subito declivibus, lateribus 4-seriatim profunde punctatis, singulatim tuberculis fasciculatis obtusis, seriebus duabus munitis, serie interiore e quatuor, basali sat elevato, serie exteriori e sex minoribus, compositis, apicibus conjunctis fortiter rotundatis; corpore infra pedibusque rugoso-squamosis. Long. 5–5½ lin.

*Hab.* Tasmania.

Like *P. verres* in the next section, but the tubercles less prominent and more numerous on the elytra.

**POROPTERUS FLEXUOSUS.** *P.* subovatus, fuscus, squamositate squamulisque griseis tectus; capite inter oculos fovea profunda impresso; rostro rugoso-punctato, basi tricarinato; oculis tenuiter granulatis; antennis piceis, art. secundo primo sesquilongiore; prothorace suboblongo, utrinque rotundato, apice paulo producto, late rotundato, lateribus antice fortiter arcuato-sulcato, supra plicato in medio longitudinaliter tricarinato; elytris ovatis, in medio prothorace latioribus, apicem versus productis, apicibus mucronatis, supra reticulato-foveatis, singulo carinis tribus curvatis notato; pedibus setis majusculis vestitis. Long. 5 lin.

*Hab.* South Australia (Adelaide).

**POROPTERUS MASTOIDEUS.** *P.* ovatus, niger, opacus, squamulis griseis omnino sat dense tectus, supra granulis nitidis minutis numerosis dispersis; capite inter oculos longitudinaliter sulcato-foveato; rostro valido, subconfertim punctato, punctis squamigeris; oculis

tenuiter granulatis; antennis piceis, funiculo art. secundo primo manifeste longiore, clava ovali; prothorace oblongo, antice constricto, supra parum convexo, pone apicem excavato, in medio tuberculis tribus instructo, uno elongato anteriore, duobus rotundatis posterioribus transversim sitis; elytris breviter ovatis, tenuiter seriatim punctatis, interstitiis planatis, humeris vix productis, apice rotundatis, singulis triseriatim tuberculatis—serie interiore e tuberculis tribus distantibus alte elevatis, exteriore e quatuor validis, intermedio unico parvo, compositis; pedibus breviter setosulis. Long. 6 lin.

*Hab.* Batchian.

**POROPTERUS APPROXIMATUS.** *P.* præcedenti affinis sed valde distinctus; *differt* rostro rugoso, irregulariter punctato, clava magis elongata; interstitiis elytrorum elevatis, serie interiore tuberculorum quinque, approximatis, minus elevatis, tuberculo secundo parvo, serie exteriore e tuberculis variis, nonnullis fere obsoletis, compositis. Long. 7 lin.

*Hab.* Kaioa.

In this species the tubercles of the exterior row are irregular in size, and not well limited. This and the last are somewhat different in habit from any of the Australian species.

Section II. *First and second joints of the funicle equal in length, or the first a little longer.*

**POROPTERUS HARIOLUS.** (Pl. VII. fig. 7.) *P.* elongato-ovatus, niger, subsilaceo-squamosus; rostro valido; antennis piceis, scapo oculum vix attingente, funiculo art. duobus basalibus fere æqualibus; oculis tenuiter granulatis; prothorace vage granulato, longe ante apicem subito constricto, tum fortiter tuberculato-producto, postice sensim angustiore, basi incurvato, supra in medio valde excavato, tuberculis duobus transversim obsitis; scutello distincto; elytris prothorace paulo latioribus, compressis, fortiter punctatis, postice sensim declivibus, granulis subnitidis subseriatim adpersis, singulatim tuberculis conicis validis in seriebus duabus instructis, exteriore e tribus, interiore e quatuor majoribus, quorum tuberculo postico validiore, compositis, apicibus tuberculis duobus minusculis terminatis; corpore infra pedibusque subvage squamosis. Long. 7-8 lin.

*Hab.* Queensland.

Differs from *P. Westwoodii*, Waterh., *inter alia*, in having the apex of each elytron bituberculate.

**POROPTERUS SPHACELATUS.** *P.* sat anguste ovatus, niger, squamis subsilaceis, plerumque erectis, vestitus; capite inter oculos fovea triangulari impresso; rostro valido, squamis erectis adperso; antennis piceis, funiculo art. duobus basalibus fere æqualibus; oculis fortiter gra-



nulatis; prothorace haud granulato, antice valde constricto, et silaceo-squamoso, utrinque rotundato, basi subbisinuato, supra in medio longitudinaliter excavato, tuberculis parvis octo instructo, in seriebus duabus æqualibus transversim sitis; scutello indistincto; elytris ovatis, compressis, prothorace basi vix latoribus, postice subito declivibus, lateribus 4-seriatim elongato-punctatis, granulisque duobus nigris nitidis basi sitis, singulo tuberculis fasciculatis in seriebus tribus instructo, serie interiore e tribus elongatis in carina positis, intermedia etiam e tribus, exteriore tuberculo unico minusculo in medio, compositis, parte declivi tuberculo parvo, apicibus conico-acuminatis, regione apicali silacea; pedibus setuloso-squamosis. Long. 6-7 lin.

*Hab.* Queensland.

This species may be placed after *P. Parryi*, Waterh., which has broad ovate elytra, considerably depressed above.

**POROPTERUS VERRES.** *P.* sat anguste ovatus, niger, squamis elongatis subsilaceis tectus; capite inter oculos fovea impresso; rostro valido, vage squamoso; antennis rufo-piceis, breviusculis; funiculo art. basali secundo paulo longiore; prothorace haud granulato, latitudine vix longiore, antice fortiter constricto, utrinque rotundato, basi subbisinuato, lobo scutellari dentiformi, supra in medio longitudinaliter excavato, tuberculis obtusis octo instructo, seriebus duabus transversim sitis; scutello invisio; elytris ovatis, prothorace perparum angustioribus, postice subito declivibus, lateribus 4-seriatim profunde elongato-punctatis, apicibus truncato, extus paulo angulatis, singulo tuberculis octo, seriebus duabus, munito, sex majoribus, in singula serie tribus, et duobus minoribus in parte declivi sitis, granulisque nigris nitidis validis prope scutellum sitis; pedibus setuloso-squamosis; tibiis fere rectis. Long. 7 lin.

*Hab.* Queensland.

Allied to the last, but unicolorous, the prothorax proportionally broader, and the first joint of the funicle perceptibly longer than the second.

#### DIATASSA.

##### (Cryptorhynchinae.)

*Rostrum* tenue, elongatum, arcuatum, basi excepta, nudum; *scrobes* medianæ, laterales, oculos attingentes. *Antennæ* graciles; *funiculus* 7-articulatus, articulis quatuor basalibus longioribus, tribus ultimis brevioribus; *clava* distincta, anguste ovata. *Oculi* laterales, grosse granulati. *Prothorax* subconicus, apice paulo productus, lobis ocularibus prominulis. *Elytra* prothorace latoria, oblongo-cordata. *Femora* elongata, subpedunculata, apicem versus valde incrassata, infra dente valido

armata, postice corpus superantia; *tibiæ* teretes, subarcuatæ; *tarsi* longiusculi, articulo tertio parum dilatato. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Metasternum* elongatum. *Abdomen* normale.

The form of the femora is eminently distinctive of this genus. I place it after *Cyamobolus*, Schön.

DIATASSA PHALERATA. (Pl. IX. fig. 2.) *D.* ovata, nigra, opaca, squamis fuscis vestita, lineisque supra dense silaceo-squamosis ornata; capite antice dense subsilaceo-squamoso, inter oculos fovea profunda impresso; rostro piceo, basi oblongo-punctato; antennis subferrugineis, funiculo articulis quatuor basalibus fere æqualibus; prothorace latitudine longitudini æquali, rude squamoso, dorso lineis silaceis, tribus longitudinalibus, una pone medium transversa, decorato; scutello silaceo-squamoso; elytris remote seriatim punctatis, punctis basi majoribus, apicem versus gradatim minoribus, linea suturali, alteraque submediana, antice angulata, tertiaque postice ad latera silaceis; corpore infra squamulis parvis sparse irrorato; pedibus dense silaceo-squamosis; clava femorum fusco-lavata. Long. 5 lin.

*Hab.* Mysol.

#### PERISSOPS.

##### (Cryptorhynchinæ.)

*Rostrum* validiusculum, subarcuatum, basi squamosum; *scrobes* medianæ, laterales, rectæ. *Scapus* oculum attingens; *funiculus* articulis duobus basalibus longiusculis, quinque ultimis moniliformibus; *clava* oblongo-ovalis, velutina. *Oculi* subgrosse granulati, antice perparum approximantes. *Prothorax* conicus, utrinque paulo rotundatus, basi bisinuatus, lobis ocularibus distinctis. *Scutellum* punctiforme. *Elytra* ovata, convexa, humeris rotundatis. *Pedes* breviusculi; *femora* incrassata, antica obsolete dentata, vel dente parvo instructa; *tibiæ* compressæ, subarcuatæ; *tarsi* vix elongati, normales. *Rima* pectoralis pone coxas anticas terminata, apice cavernosa. *Metasternum* modice elongatum. *Abdomen* normale.

The type of this genus has long been known in collections under the name of *Perissops lynx* (Jekel), but was first published in the 'Novara Voyage,' by Redtenbacher, who referred it to *Enteles* (*E. ocellatus*, Redbr.). *Enteles* differs from *Perissops* in many of the characters given above, notably in its longer slender rostrum, with the pectoral canal open at the apex, and extending

to the intermediate coxæ, its extremely short metasternum and long legs. *Perissops*, according to Lacordaire's arrangement, would be near *Cyamobolus*, Schön. Besides a second Australian species, which differs from the typical form in having a small tooth to all the femora, I place here one from Gilolo, Dorey, &c. very distinct from the others, although I am unable to separate it generically.

**PERISSOPS MUCIDUS.** *P. ovatus*, nigrescens, vage fusco-squamosus, squamisque silaceis plagiatis condensatis; rostro valido vix nitido, apicem versus depresso, basi tricarinato et vage squamoso; antennis piceis; clava (ut videtur) triarticulata, articulo ultimo brevissimo; prothorace squamis silaceis induto, vittas tres simulantibus; elytris valde convexis, maculis silaceis irregulariter decoratis; corpore infra pedibusque subvage squamosis. Long. 4-6 lin.

*Hab.* Queensland.

In *P. ocellatus* the club is more elongate, the basal joint, which is very oblique at the apex, and deeply emarginate on one side, is very long and cylindrical; hence this organ affords no generic character.

**PERISSOPS ILIACUS.** *P. ovatus*, nigro-piceus, omnino dense subsilaceo-squamosus; capite convexo, vage squamoso; rostro rufo-piceo, subnitido; funiculo articulis duobus basalibus æqualibus; clava oblongo-ovata, distincta, quadriarticulata, articulis duobus intermediis longitudine fere æqualibus, basali longiore, ultimo brevissimo; oculis antice approximatis; prothorace basi paulo latiore quam longiore, antice fusco; scutello nigro; elytris ovatis, subtiliter striato-punctatis, utrinque in medio plaga maxima fusca, aliquando pallide marginata, decoratis; femoribus, præsertim anticis, dente acuto instructis. Long. 3½ lin.

*Hab.* Gilolo; Dorey; Aru; Mysol.

## OROCHLESIS.

### (Cryptorhynchinæ.)

*Rostrum* breviusculum, vix vel parum arcuatum, basi latius, apicem versus gradatim angustius, denudatum; *scrobes* fere medianæ, subobliquæ. *Scapus* oculum vix attingens; *funiculus* brevis, articulo basali crassiore, cæteris gradatim incrassatis, quinque ultimis transversis; *clava* breviter ovata. *Oculi* grosse granulati, antice paulo approximantes. *Prothorax* transversus, antice valde angustus, utrinque rotundatus, apice vix productus, lobis ocularibus nullis. *Scutellum* rotundatum. *Elytra* bre-

viter ovata, convexa, prothorace haud latiora. *Pedes* breves; *femora* valida, compressa, infra canaliculata, mutica; *tibiæ* arcuatae, sulcatae; *tarsi* normales. *Rima* pectoralis pone coxas anticas terminata, apice cavernosa. *Metasternum* breve. *Abdomen* segmentis duobus basalibus valde ampliatis.

Allied to the preceding, but with a shorter rostrum, the prothorax at the base as broad as the elytra, the femora grooved for the reception of the tibiæ, and the two basal segments of the abdomen unusually large.

**OROCHLESIS ANNULARIS.** (Pl. VIII. fig. 2.) *O. ovata*, picea, squamis griseis plerumque sat dense tecta; rostro fere recto, dimidio apicali nitido, vage punctulato; antennis testaceis; prothorace longitudine sesquialtiore, squamis pallidioribus variegato; scutello nigro, nitido; elytris striato-punctatis, punctis singulis squamam niveam gerentibus, apice rotundatis, plaga communi orbiculari, saturate vinosa, albido-marginata, postice ornatis; corpore infra fortiter punctato, punctis unisquamigeris; pedibus vage squamosis. Long.  $1\frac{3}{4}$ – $2\frac{1}{2}$  lin.

*Hab.* Dorey; Batchian; Penang.

The spot on the elytra has a dark claret-brown hue, is free from scales, and has, although opaque, a somewhat velvety appearance. The specimens from Penang, taken by Mr. Lamb, do not differ from the Dorey insect which I have selected as the type.

**OROCHLESIS SOLEA.** *O. ovata*, nigra, squamosa; rostro parum arcuato, piceo, subtilissime punctulato; antennis testaceis; oculis magis approximatis; prothorace fortiter reticulato-punctato, punctis singulis squamam magnam ochraceam oblongam gerentibus, apice utrinque macula niveo-squamosa ornato; scutello nigro, nitido; elytris striato-punctatis, punctis oblongis, unisquamigeris, interstitiis pallide silaceo-squamosis, nigro-maculatis, in singulo elytro maculis duabus niveis, una subbasali, altera exteriore, sitis; corpore infra fortiter punctato, segmentis tertio quartoque abdominis exceptis, punctis unisquamigeris; pedibus piceis, vage squamosis. Long.  $1\frac{3}{4}$  lin.

*Hab.* Batchian.

**OROCHLESIS FLESINA.** *O. ovata*, nigra, squamosa; rostro paulo arcuato, piceo, vage punctulato; antennis subtestaceis; prothorace fortiter reticulato-punctato, in medio punctis singulis squamam parvam concolorem gerentibus, ad latera squamis majoribus instructo; scutello nigro, nitido; elytris striato-punctatis, punctis ovatis, unisquamigeris, pallide silaceis, plaga magna laterali, altera in utroque elytro prope apicem, alteraque communi ante medium, maculisque paucis



minutis notatis; corpore infra pedibusque ut in præcedente, sed abdomine segmentis tertio quartoque paulo punctatis. Long.  $1\frac{3}{4}$  lin.

*Hab.* Aru.

#### APRIES.

#### (Cryptorhynchinæ.)

*Rostrum* mediocre, paulo arcuatum, squamosum, basi utrinque ante oculos transverse sulcatum; *scrobes* præmedianæ, obliquæ; *scapus* oculum haud attingens; *funiculus* 7-articulatus, articulis duobus basalibus parum longiusculis, cæteris gradatim brevioribus et latoribus, ultimis transversis; *clava* parva, ovata, distincta. *Oculi* laterales, grosse granulati. *Prothorax* transversus, antice subito constrictus, apice productus. *Scutellum* elevatum. *Elytra* convexa, prothorace multo latoria, postice declivia. *Pedes* breviusculi; *femora* sublinearia, valida, infra dentata; *tibiæ* extus incurvatæ, intus bisinuatæ; *tarsi* breves, articulo quarto squamis erectis munito. *Rima* pectoralis ad coxas intermedias extensa, apice cavernosa. *Abdomen* segmentis duobus basalibus valde ampliatis.

The groove immediately before the eye, the peculiar character of this genus, terminates in the scrobe, both running out beneath. The two species here described differ somewhat in appearance, owing to the outline, but they conform to the above formula. The genus is allied to *Chætectetorus*, Schön.

APRIES EREMITA. (Pl. IX. fig. 6.) *A. oblongus*, squamositate grisea ubique densissime tectus, supra pedibusque squamis elongatis erectis interjectis; capite antice profunde excavato, inter oculos gibboso; rostro in medio sat subito arcuato, apicem versus paulo latiore, basi longitudinaliter sulcato; antennis subtestaceis; prothorace postice parallelo, supra fortiter trisulcato, interstitiis duobus validis tuberculisque fasciculatis quatuor munitis, 2 apicalibus, 2 medianis, tuberculo minore utrinque in medio notato; elytris subcylindricis, striatopunctatis, punctis linearibus, interstitiis angulato-convexis, alternis magis elevatis, sparse fasciculatis, fasciculis plurimis, præsertim interstitio tertio et parte declivi squama elongata instructis; abdomine segmentis duobus basalibus vage punctato-impressis. Long. 5 lin.

*Hab.* Batchian.

APRIES PALLIATUS. *A. breviusculus*, subovatus, squamis vel squamositate sordide grisea, dorso umbrino excepto, ubique tectus; capite antice haud excavato, rostro longiusculo, apicem versus gradatim

latiore; antennis subtestaceis; prothorace tuberculis plurimis tecto, utrinque quatuor, parvis, supra sex majoribus, totis plus minusve fasciculatis; elytris utrinque parum rotundatis, striato-punctatis, punctis subrotundatis, interstitiis vix convexis, inæqualiter tuberculatis, tuberculis plurimis squama spiniformi instructis, basi duobus, uno juxta scutellum, altero humerali, majusculis, rugoso-squamosis. Long. 4 lin.

*Hab.* Saylee.

The scales of the rostrum and prothorax are, to a certain extent, cup-shaped, giving those parts a peculiar honeycomb appearance; on the elytra there is rather a squamosity than true scales.

### ZEUGENIA.

(Cryptorhynchinæ.)

*Rostrum* tenue, arcuatum, nudum; *scrobes* præmedianæ, laterales, rectæ, ad oculos desinentes. *Scapus* brevis; *funiculus* 7-articulatus, articulis elongatis; *clava* valida, distincta, obsolete articulata. *Oculi* sat magni, grosse granulati. *Prothorax* transversus, antice valde angustior, lobis ocularibus nullis. *Scutellum* punctiforme. *Elytra* obovata, prothorace vix latiora. *Pedes* breviusculi; *femora* compressa, incrassata, infra canaliculata, dente parvo instructa; *tibiæ* arcuatæ, sulcatæ; *tarsi* normales. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Abdomen* segmentis tribus intermediis æqualibus.

This genus has the habit of *Chætectetorus*, only broader, and at once differentiated by the three intermediate segments of the abdomen being of equal length. The three species here described are marked on the forehead with a well-defined snowy spot, which is distinctly three-lobed above.

**ZEUGENIA HISTRIO.** (Pl. VIII. fig. 11.) *Z.* sat late ovata, nigra, squamis plerumque vage tecta; capite supra oculos dense albido-squamoso; rostro piceo, nitido, subtiliter punctulato; antennis ferrugineis, nitidis; funiculo art. duobus basalibus longioribus, longitudine æqualibus, primo crassiore, tertio quartoque obovatis, gradatim brevioribus, tribus ultimis ovatis; clava ovali, dense pubescente; prothorace valde transverso, silaceo, antice nigro, basi maculis tribus, intermedia majore triangulari, albis ornato, fasciculis sex nigris notatis—2 apicalibus, 4 ante medium transversim sitis; scutello orbiculari; elytris a basi gradatim angustioribus, apice obtuse rotundatis, fortiter striato-punctatis, supra obscure ochraceis, nigro-fasci-

culatis, humeris plaga obliqua læte silacea decoratis, singulo elytro maculis posticis duabus albis—una interstitiis tertio quartoque sita, altera marginali; corpore infra pedibusque vage squamosis. Long. 3 lin.

*Hab.* Sarawak.

The dark suture represented in the figure is owing to that part of the specimen having had some of the scales rubbed off.

**ZEUGENIA HISTRIONICA.** *Z. præcedenti* differt, funiculo brevior, clava ovata fere conica; prothorace minus transverso, antice fasciculisque silaceis, macula intermedia basali maxima; elytris basi pallidioribus, prope apicem macula communi magna alba ornatis. Long.  $2\frac{2}{3}$  lin.

*Hab.* Penang.

**ZEUGENIA FIGURATA.** *Z. modice* ovata, rufo-ferruginea, cæteris ut in *Z. histrione*, sed funiculo brevior, clava angustior, magis acuminata; prothorace longitudine paulo latiore, antice fasciculisque silaceis, macula intermedia basali maxima, utrinque linea longitudinali et infra macula subquadrata albis ornatis; scutello rhomboidali, albo; elytris angustioribus, prope apicem macula communi magna alba ornatis, ad latera maculis albis notatis; corpore infra pedibusque ferrugineis, illo squamis subochraceis parcius irroratis. Long.  $2\frac{1}{2}$  lin.

*Hab.* Sarawak.

These three species are much alike in coloration, but are sufficiently differentiated by the antennæ, prothorax, and scutellum.

## OMYDAUS.

(Cryptorhynchinae.)

*Rostrum* modice elongatum, validum, perparum arcuatum, rude punctatum; *scrobes* antemedianæ, rectæ. *Scapus* oculum attingens; *funiculus* 7-articulatus, articulis duobus basalibus longiusculis, cæteris transversis, submoniliformibus; *clava* parva, distincta, ovata. *Oculi* laterales, tenuiter granulati. *Prothorax* subtransversus, utrinque rotundatus, apice angustus, paulo productus, basi bisinuatus, lobis ocularibus vix prominulis. *Elytra* prothorace parum latiora, dorso subdepresso. *Pedes* validi, antici haud elongati, postici longiores; *femora* incrassata, infra unidentata; *tibiæ* intus flexuosæ, apice unco horizontali armatæ; *tarsi* normales. *Rima* pectoralis pone coxas anticas terminata, apice cavernosa. *Metasternum* breviusculum. *Abdomen* segmentis tribus intermediis æqualibus.

The relative length of the abdominal segments, and the characters of the pectoral canal, place this genus in the vicinity of

*Gasterocercus*. In habit it is like *Plinthus Sturmii*. But for the well-marked metathoracic episterna, its affinities would seem to be nearer to *Poropterus*.

OMYDAUS PLINTHOIDES. *O. ovatus*, niger, opacus, squamis sordide griseis conspersus; capite rostroque basi confertim punctatis; antennis piceis; prothorace reticulato-punctato, punctis sæpe confluentibus, in medio manifeste longitudinaliter carinato; scutello subtransverso; elytris seriatim favosis, interstitiis alternis paulo elevatis; corpore infra vage punctato, squamis subsilaceis adperso; pedibus rude punctatis, setulis nigris erectis sparse adpersis. Long. 5 lin.

*Hab.* New South Wales (Illawarra).

The following genera, as far as *Æsychora*, belong to that part of Lacordaire's "groupe Cryptorhynchides vrais," which has a pectoral canal extending to the intermediate coxæ, and its apex open\*; those of them which have the three intermediate segments of the abdomen equal, and are allied to *Pezichus*, may be tabulated as follows:—

Femora grooved beneath for the reception of the tibiæ.

First tarsal joint moderate or short . . . *Sybulus*.

First tarsal joint long . . . . . *Glyphagia*.

Femora not grooved beneath.

Club of the antennæ cylindrical.

Elytra broader than the prothorax at the base.

(*Pezichus*, Waterh.).

Elytra not broader than the prothorax. *Endymia*.

Club of the antennæ ovate . . . . . *Panopides*.

## ENDYMIA.

### (Cryptorhynchinæ.)

*Rostrum* æquilatum, tenuatum, arcuatum; *scrobes* rectæ, in ♀ submedianæ, in ♂ subterminales, ante oculos attingentes.

\* "*En gouttière*" of Lacordaire. This character, however, must be taken with a certain reservation. In *Cryptorhynchus lapathi* the canal is not open at the apex to the same degree as in *Macromerus crinitarsis* (I take these two well-known forms as an illustration); it is, I should say, slightly cavernous: but then the mesosternum, in which the apex of most of the Cryptorhynchinæ terminates, is not vaulted, or raised at the edges in the same way as in the truly cavernous structure. But in this as in other characters there are transitions which it is scarcely possible to limit.



*Scapus* elongatus, oculum attingens; *funiculus* (♂) art. quatuor basalibus longiusculis; *clava* in utroque sexu elongata, subcylindrica, attenuata. *Oculi* magni, antice approximantes. *Prothorax* conicus, apice paulo productus, basi bisinuatus. *Elytra* subovata, prothorace basi haud latiora. *Pedes* elongati, antici longiores; *femora* vix incrassata, infra dente parvo armata; *tibiæ* paulo arcuatæ; *tarsi* art. basali cæteris conjunctim longiore, tertio late bilobo. *Rima* pectoralis apice subaperta, marginata. *Abdomen* segmento secundo breviusculo. *Processus* intercoxalis latus, antice obtuse angulatus.

The female of *E. vipio* is stouter, with shorter legs and thicker femora than the male; the rostrum also is shorter and stouter at the base, and the tibiæ shorter and nearly straight. In the male the funicle is scarcely a third longer than the club, while in the female this proportion is exactly reversed. I have the female of another species from Macassar.

**ENDYMIA VIPIO.** (Pl. VIII. fig. 5, ♂.) *E.* (♂) subelliptica, nigra, nitida, squamis silaceis albo fuscoque variis sat dense tecta; rostro capite quadruplo longiore, piceo, æquilato; antennis ferrugineis; funiculo art. secundo longiore, primo tertioque æqualibus, quarto præcedenti paulo brevior, tribus ultimis oblongis; clava dense griseotomentosa, art. tribus basalibus apice obliquis; prothorace latitudine paulo longiore, basi paulo depresso et subdenudato, vage punctato; scutello nigro, rotundato; elytris pone basin latioribus, apice rotundatis, supra striato-punctatis, punctis haud approximatis, singulis squamam albidam gerentibus, interstitiis angustis, valde convexis, uniseriatim vage granulatis; corpore infra pedibusque sparse albidosquamosis; tarsis subtus longe flavescenti-pilosis. Long.  $4\frac{1}{2}$  lin.

*Hab.* Batchian; Dorey.

#### PANOPIDES.

##### (Cryptorhynchinæ.)

*Rostrum* modice tenuatum, basi crassiore, apice latiore; *scrobes* medianæ, obliquæ. *Scapus* oculum haud attingens; *funiculus* art. tertio longiusculo. *Prothorax* oblongus, apice paulo productus, basi truncatus; *clava* ovata. *Elytra* subcylindrica, prothorace haud latiora. *Pedes* elongati, tenuati; *tibiæ* rectæ; *tarsi* art. basali elongato, tertio brevi, late bilobo. *Rima* pectoralis apice aperta. *Abdomen* segmentis basalibus modice ampliatis. *Processus* intercoxalis latus, antice obtuse angulatus.

A very marked form, owing partly to the length and slender-

ness of the legs. The punctures on the prothorax have each a single narrow horizontal scale arising from the posterior border; those on the elytra are larger and without scales.

**PANOPIDES ANTICUS.** (Pl. VIII. fig. 4.) *P. oblongo-ovatus*, fuscus, capite, rostro basi, prothorace antice, maculaque prope scutellum dense albido-squamosis; rostro prothorace plus duplo longiore, piceo, subtilissime vage punctato; antennis ferrugineis; funiculo art. secundo primo sesquolongiore, tertio duplo longiore, sequentibus subobconicis, gradatim crassioribus; clava ovata, distincta; prothorace antice constricto, medio utrinque rotundato, basin versus parallelo, supra, apice excepto, crebre punctato, punctis singulis unisquamosis; scutello transverso; elytris breviusculis, utrinque sensim parum angustioribus, apice rotundatis, supra fortiter sulcato-punctatis, sulcis exterioribus in medio arcuatis, punctis nitidis approximatis, interstitiis elevatis, tertio pone medium magis elevato, uniseriatim punctatis, punctis parvis, singulis setula albida munitis, angulo anteriore, basi apiceque plaga albido-squamosa ornatis; corpore infra pedibusque fuscis, ochraceo-variegatis. Long. 4 lin.

*Hab.* Tondano.

#### GLYPHAGIA.

##### (Cryptorhynchinæ.)

*Rostrum* tenue, æquilatum, arcuatum; *scrobes* præmedianæ, laterales. *Funiculus* tenuis, articulis quatuor basalibus elongatis, cæteris ovalibus, vix crassioribus; *clava* longiuscula, valida, subcylindrica, dense pubescens. *Oculi* sat magni, antice subapproximati, grosse granulati. *Prothorax* transversus, antice angustus, utrinque rotundatus, lobis ocularibus nullis. *Elytra* oblongo-cordata, prothorace parum latiora. *Pedes* longiusculi; *femora* incrassata, infra canaliculata, unidentata; *tibiæ* longiusculæ, compressæ, rectæ, basi solo armatæ, apicem versus tenuiores; *tarsi* articulo basali elongato, tertio anguste bilobo. *Rima* pectoralis apice aperta.

This genus has for its type a small species of which I have seen only a single specimen; and this has on its first abdominal segment a round cavity with raised edges (cup-shaped in fact), probably analogous to the "plate" of *Amydala*, a genus which will be found further on. It may be sexual. The upper surface of this insect is mottled with ochreous, grey, and brown, in proportions that defy description.

**GLYPHAGIA INSCULPTA.** *G. ovalis*, rufo-picea, squamis griseis fusciscenti-nebulosis sat confertim dispositis; rostro pallide ferrugineo,  
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subtiliter punctulato, basi capiteque sat dense squamosis; antennis subtestaceis; prothorace in medio postice paulo elevato, squamis plurimis in medio sulcatis; elytris striato-punctatis, punctis ovatis, remotis, interstitiis alternis latioribus, elevatis, apicibus rotundatis; corpore infra squamis majoribus minoribus commixtis irrorato; pedibus magis dense squamosis. Long. 3 lin.

*Hab.* Batchian.

#### SYBULUS.

##### (Cryptorhynchinæ.)

*Rostrum* tenue, arcuatum, basi excepta, nudum; *scrobes* medianæ, laterales, rectæ. *Scapus* oculum attingens; *funiculus* articulis quatuor basalibus elongatis; *clava* longiuscula, crassa, cylindrica, dense pubescens. *Oculi* magni, grosse granulati, antice subapproximati. *Prothorax* transversus, antice angustior, utrinque rotundatus, lobis ocularibus haud prominentibus. *Elytra* ovata, prothorace vix latiora. *Pedes* mediocres; *femora* compressa, incrassata, infra canaliculata et uni- vel bidentata; *tibiæ* breviusculæ, compressæ, arcuatæ, sulcatæ; *tarsi* articulo basali mediocri, tertio late bilobo. *Rima* pectoralis marginata, apice subaperta.

These characters are drawn up from a single specimen, probably a male, and which may be likened in habit to *Cryptorhynchus lapathi*. Besides the two species here described, there are four more in my collection, from Dorey, Mysol, and two from Sarawak respectively.

**SYBULUS PECCUARIUS.** *S. ovatus*, niger, sat dense silaceo-squamosus, fusco-alboque varius; rostro piceo, nitido, subtiliter punctulato; antennis testaceis; funiculo articulo secundo longiore, primo tertioque æqualibus, 4. 5. gradatim brevioribus, duobus ultimis rotundatis; prothorace fusco-irrorato maculisque quinque albis ornatis—una antice, quatuor in medio transversim sitis, utrinque plagis duabus albis notatis; elytris sulcato-punctatis, nigro-irroratis, singulis maculis duabus albis decoratis, una ante, altera pone medium; corpore infra pedibusque piceis, vage squamosis; femoribus infra bidentatis. Long. 3 lin.

*Hab.* Batchian.

**SYBULUS INCENSUS.** *S. late ovatus*, niger, sat dense albido-silaceoque variegatus, supra squamis plurimis elongatis erectis nigris interjectis; rostro piceo, nitido, subtilissime punctulato; antennis subferrugineis; prothorace valde transversus; elytris striato-punctatis, punctis elongatis, unisquamigeris, interstitiis latis, elevatis, e squamis

erectis confertis, nigro-maculatis, præcipue interstitiis secundo tertioque; corpore infra pedibusque fuscis, squamis subsilaceis sat dense tectis; femoribus fortiter incrassatis, infra bidentatis; tibiis breviusculis, validis. Long.  $3\frac{1}{2}$  lin.

*Hab.* Singapore.

### REBIUS.

#### (Cryptorhynchinæ.)

*Rostrum* modice tenuatum, arcuatum, rude punctatum, utrinque sulco elongato insculptum; *scrobes* præmedianæ, rectæ. *Scapus* gradatim clavatus, oculum attingens; *funiculus* 7-articulatus, articulo primo crassiore, secundo sesquilongiore, tertio quartoque ovalibus, cæteris submoniliformibus; *clava* cylindrica, elongata. *Oculi* laterales, grosse granulati. *Prothorax* breviter subconicus, apice parum productus. *Elytra* oblongo-cordata, prothorace multo latiora. *Pedes* mediocres; *femora* elongata, sublinearia, postica elytros superantia, infra dentata; *tibiæ* graciles, arcuatæ, sulcatæ; *tarsi* articulis duobus basalibus angustis, tertio lato. *Rima* pectoralis inter coxas intermedias protensa, apice subaperta. *Metasternum* modice elongatum. *Abdomen* normale.

According to Lacordaire's system, this genus will rank near *Enteles*, Schön., from which it is differentiated, *inter alia*, by its coarsely faceted eyes and sulcate tibiæ. The species described below is black, thinly clothed with minute sooty scales almost amounting to squamosity, except on certain parts, where the scales are larger, more closely placed, and of a clear ochreous-yellow colour.

**REBIUS LATIFASCIATUS.** (Pl. VIII. fig. 3.) *R. ovatus*, niger, squamis inconspicuis fuligineis, aliisque ochraceis vestitus; rostro longitudine prothoracis æquali, antice linea elevata instructo; antennis testaceis; prothorace nigro, setaceo-squamoso, vittis duabus ochraceis ornato; scutello obovato, nitido; elytris seriatim punctatis, punctis linearibus, interstitiis planatis, basi utrinque vittis duabus abbreviatis, et pone medium fascia lata communi, pallide ochraceis conspicue decoratis; corpore infra nigro-nitido; pedibus vage subtiliter squamosis. Long.  $2\frac{1}{2}$  lin.

*Hab.* Tondano.

### NECHYRUS.

#### (Cryptorhynchinæ.)

*Caput* parvum; *rostrum* elongatum, tenuatum, apicem versus nu-



dum; *scrobes* medianæ, subobliquæ, ad partem inferiorem oculorum currentes. *Scapus* oculum vix attingens; *funiculus* 7-articulatus, squamulosus, art. secundo longiusculo, sequentibus submoniliformibus; *clava* distincta, breviter ovata. *Oculi* subtenuiter granulati, antice sat approximantes. *Prothorax* apice valde angustus, antice utrinque fortiter rotundatus, deinde parallelus, lobis ocularibus angustis. *Scutellum* rotundatum. *Elytra* breviuscula, convexa, vel paulo depressa, ovata, basi trisinuata, prothorace latiora, postice declivia, humeris productis. *Pedes* elongati, pilis erectis instructi, intermediis minores; *femora* sublinearia, mutica; *tibiæ* longiusculæ, rectæ, subteretes, unco subhorizontali armatæ; *tarsi* longiusculi, articulo tertio lato, quarto valde elongato, squamuloso; *unguiculi* parvi. *Rima* pectoralis inter coxas intermedias protensa, apice aperta. *Abdomen* normale.

The members of this genus have much the appearance of *Cnemargus chamaeleon*; they have a long claw-joint, and are probably numerous, as Mr. Wallace's collection contains about twenty species. The tufts on the prothorax and elytra consist of short erect scales much darker than those elsewhere; and the punctures on same parts have mostly a scale at the bottom of each.

**NECHYRUS LEMUR.** (Pl. VIII. fig. 7.) *N. ovatus*, fuscus, omnino griseo-squamosus, supra nigro fasciculatus; capite antice convexo, inter oculos fovea oblonga profunde insculpto; rostro piceo, basi sat grosse punctato, punctis singulis squama unica repletis, apicem versus vage leviter punctato; antennis piceis; prothorace subtransverso, sat fortiter punctato, supra fusco-bivittato vel biplagiato, fasciculis sex nigris notatis, 2 apicalibus, 2 medianis, 1 utrinque antice sito; elytris basi paulo planatis, humeris auritis, apice parum productis et rotundatis, striato-punctatis, punctis leviter impressis, interstitiis convexis, tertio quintoque basi, iisdem quartoque pone medium nigro-fasciculatis, lateribus vage granulatis. Long. 5-6 lin.

*Hab.* Amboyna; Goram; Batchian.

**NECHYRUS PUNCTICOLLIS.** *N. ovatus*, fuscus, haud dense omnino silaceo-squamosus, supra fusco-fasciculatus; capite rostroque ut in præcedente; prothorace quam latitudine longiore, fortiter punctato, punctis nitidis unisquamigeris, plerumque modice confertis, interstitiis sat dense squamosis, fasciculis sex fuscis notatis—ut in præcedente dispositis; elytris prothorace parum latioribus, humeris antice paulo productis, striato-punctatis, punctis approximatis foveiformibus, squamosis, interstitiis angustis elevatis granulatis, inter-

stitio tertio fasciculis tribus, quinto duobus fuscis, apice rotundatis.  
Long.  $5\frac{1}{2}$  lin.

*Hab.* Aru; Saylee.

This species differs from the last in coloration as well as in being narrower and more coarsely punctured, the elytra not produced at the apex, &c.

**NECHYRUS RUIDUS.** *N. ovatus*, fuscus, sat dense omnino sordide silaceo-squamosus; rostro basi sat fortiter punctato, punctis squamigeris; prothorace quam latitudine longiore, squamis elongatis dispersis, confertim rugoso-punctato, punctis opacis, in medio leviter carinulato, fasciculis quatuor notato—2 apicalibus, 2 medianis; elytris latioribus, humeris subauritis, striato-punctatis, punctis oblongis, haud approximatis, interstitio suturali granulato, elytro singulo fasciculis octo (circa) notato—1 basali, 2 subbasalibus, 3 pone medium, 2 posticis—plerumque in interstitiis tertio quintoque sitis; lateribus sparse granulatis, apicibus rotundatis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Batchian; Kaioa.

The tufts on the elytra of this species are mostly very small, and are here and there united, or nearly so; in a specimen from Kaioa about twelve may be counted on each elytron.

**NECHYRUS GENICULATUS.** *N. ovatus*, fuscus, sat dense silaceo-squamosus; capite rostroque ut in *N. lemure*, sed fovea minore; prothorace longitudine latitudini æquali, fortiter punctato, punctis opacis, sat confertis, singulis squamam gerentibus, fasciculis quatuor fuscis notatis—2 apicalibus, 2 præmedianis; elytris prothorace manifeste latioribus, humeris oblique angulatis, postice modice declivibus, supra profunde striato-punctatis, interstitiis elevatis granulatis, interstitio suturali obsolete trifasciculato, tertio etiam fasciculis tribus—uno subbasali, uno mediano, tertio exiguo postico, apice rotundato; femoribus apice tibiisque basi nigris. Long. 5 lin.

*Hab.* Mysol.

The sculpture of the prothorax is like that of *N. puncticollis*; but it is otherwise of the elytra, which have also twin tufts and a pronounced angle at the shoulder.

**NECHYRUS PANISCUS.** *N. ovatus*, niger, rude atro-squamulosus, squamis silaceis conspicue interjectis; rostro nigro, nitido; antennis ferrugineis, funiculo art. secundo quam primo fere duplo longiore; prothorace sat fortiter transverso, subvage punctato, punctis squamam erectam gerentibus; scutello triangulari; elytris fortiter seriatim punctatis, singulo elytro fasciculis atris tribus ornato, uno magno pone medium fasciam simulante, alteris anterioribus; corpore infra nigro, subcrebre punctato; femoribus tibiisque aterrimis, sat dense erecto-squamosis; tarsis obscure flavis. Long. 5 lin.

*Hab.* Amboyna.

This and the following species have the tibiæ shorter and more compressed than the preceding; the elytra also are somewhat depressed; between them, however, are intermediate forms which make any trenchant limitation impossible.

Besides the places mentioned below, there are species from Amboyna, Key, Aru, Saylee, and Sarawak.

**NECHYRUS NOTATUS.** *N. oblongo-ovatus*, niger, griseo-squamosus, fasciculis atris ornatus; rostro breviusculo, nitide castaneo; antennis rufo-ferrugineis; funiculo art. duobus basalibus æqualibus, ultimis transversis; prothorace vix transverso, apice manifeste tubulato, fasciculis determinatis octo notatis, 2 anticis, 4 medianis, 2 basalibus; scutello punctiformi; elytris fortiter striato-punctatis, nigro subfasciculatis, singulatim fasciculis quinque (circa) longitudinaliter sitis, pone medium macula parva albida ornatis; corpore infra nigro, sat vage punctato; pedibus rude griseo-squamosis. Long.  $3\frac{1}{2}$  lin.

*Hab.* Saylee.

The first two joints of the funicle are nearly of equal length in this species; *N. geniculatus* in this respect is between the two extremes.

**NECHYRUS FUNEBRIS.** *N. ovatus*, niger, sparse fusco-squamosus, aliisque erectis nigris dispersis; rostro piceo, quam prothorace paulo brevior; prothorace utrinque subampliato, antice subito angustiore, postice fere parallelo, medio paulo excavato, fortiter punctato et granulato, fasciculis sex inconspicuis notato—2 antice, 4 in medio transversim, sitis; scutello elongato-triangulari, ochraceo; elytris leviter striato-punctatis, interstitiis granulis nitidis dispersis, singulo elytro fasciculis quinque obscure notato—2 basalibus, 2 posticis, una intermedia; corpore infra pedibusque rugoso-squamosis. Long. 5 lin.

*Hab.* Batchian.

**NECHYRUS PORCATUS.** *N. ovatus*, niger, squamis crassis vage indutus, etiam perpaucis ochraceis dispersis; rostro piceo, quam prothorace paulo brevior; prothorace antice utrinque sensim rotundato, postice minus parallelo, leviter sat crebre punctato, punctis squamositate grisea repletis; scutello suborbiculari; elytris sulcato-punctatis, punctis magnis oblongis nitidis, interstitiis convexis, singulo elytro fasciculis tribus atris notato, uno pone medium maximo; corpore infra pedibusque rugoso-squamosis; tarsis sordide albidis. Long. 4 lin.

*Hab.* Ceram.

This species has no tufts on the prothorax; those on the elytra consist of scales more crowded than elsewhere, and have the appearance of black spots. The ochreous scales are very few, and can only be seen under a good lens.

**NECHYRUS SATYRUS.** *N. oblongus*, ovalis, niger; rostro quam prothorace paulo longiore, vix nitido; prothorace forma præcedentis, supra sat crebre modice punctato, punctis plurimis squama magna rotunda repletis; scutello suborbiculari; elytris sulcato-punctatis punctis oblongis nitidis, interstitiis latis convexis, sat dense nigro-squamosis; corpore infra pedibusque squamis erectis nigris vestitis, aliisque albidis dispersis; tarsis sordide albidis. Long. 7 lin.

*Hab.* Gilolo.

There are no tufts on this species, and no crest-scales on the upper surface; the pectoral canal extends nearly to the posterior margin of the intermediate coxæ.

### SYRICHIUS.

#### (Cryptorhynchinæ.)

*Rostrum* modice elongatum, arcuatum, depressum, basi excepta nudum, nitidum, fere impunctatum; *scrobes* medianæ, rectæ. *Scapus* apice clavatus; *funiculus* 7-articulatus, articulis duobus basalibus longiusculis, subæqualibus, vel secundo paulo longiore, cæteris gradatim brevioribus, submoniliiformibus; *clava* ovalis, distincta. *Oculi* fortiter granulati. *Prothorax* utrinque rotundatus, apice angustior, basi bisinuatus, lobo scutellari distincto. *Scutellum* elevatum. *Elytra* elongato-cordata, convexa, pone humeros latiora, apice rotundata. *Pedes* subelongati; *femora* modice incrassata, antice validiora, infra dentata; *tibiæ* rectæ, compressæ, antice intus bisinuatæ; *tarsi* normales. *Rima* pectoralis ut in præcedente sed apice subaperta. *Metasternum* brevissimum. *Abdomen* normale.

The femora thicker and the anterior ones toothed beneath, the eyes coarsely faceted, and the form of the elytra will differentiate this genus from the preceding.

**SYRICHIUS RORIDUS.** *S. niger*, supra squamis fuscis sordide griseisque maculatim vestitus; capite fusco-squamoso, inter oculos granulato; rostro piceo; antennis ferrugineis; prothorace granulis majusculis sat vage munito, inter hæc plerumque squamis fuscis dispersis; elytris profunde striatis, interstitiis latis, convexis, interrupte griseo-squamosis, granulis oblongis subapproximatis uniseriatim instructis; corpore infra pedibusque sordide fusco-squamosis; femoribus, præsertim anticis, granulatis. Long.  $4\frac{1}{2}$  lin.

*Hab.* Kaioa.

The greyish or ochreous-grey scales are scattered so as to give a



finely speckled appearance to the upper parts, or rather to the elytra.

**SYRICHIVS DISSIPATUS.** *S. niger*, supra squamis silaceo-griseis fuscisque plagiatis vestitus; capite griseo, antice plagam magnam fuscam includente, margine inferiore granulato; rostro piceo; antennis subferrugineis; prothorace griseo, fusco-plagiato, præsertim plagis duabus anticis magis distinctis, postice lateribusque rude punctato et irregulariter granulato; scutello postice latiore; elytris profunde striatis, interstitiis latis, convexis, granulis minusculis haud approximatis uniseriatim instructis, basi medioque fuscescenti-plagiatis; corpore infra pedibusque sordide griseo-squamosis, femoribus tibiisque fusco-lavatis. Long. 5 lin.

*Hab.* Morty.

Differs, *inter alia*, from the last in the distribution of the granules, which are smaller and more distant on the elytra, and interrupted by a narrow band just before the middle of the prothorax.

**SYRICHIVS FRONTALIS.** *S. niger*, dense squamosus, concinne variegatus; capite silaceo-squamoso, antice plaga albida ornato; rostro ferrugineo; prothorace granulis minusculis vage munito, albido-squamoso, basi præcipue silaceo-lavato; elytris totis squamis albidis silaceo variis tectis, striatis, interstitiis acute costatis, summa costarum granulis parvis uniseriatim remote dispositis; corpore infra pedibusque griseo-squamosis; femoribus granulis minutis dispersis. Long.  $4\frac{1}{2}$  lin.

*Hab.* Bouru; Ceram.

A prettily variegated species; the grooves of the elytra marked by a very narrow black line.

**SYRICHIVS PROLETARIUS.** *S. latior*, *niger*, omnino griseo-squamosus; capite inter oculos paulo excavato; rostro ferrugineo, brevior, dimidio apicali remote subtiliter punctato; antennis subtestaceis; prothorace haud granulato, valde transverso, apice manifeste tubulato, squamis in medio depressis, apice liberis; elytris striato-punctatis, punctis unisquamigeris, interstitiis elevatis, rugoso-granulatis; corpore infra squamis ut in prothorace. Long.  $3\frac{1}{4}$  lin.

*Hab.* Matabello; Gilolo.

A broader species than any of the preceding, the elytra but very slightly narrower at the base, the scales on the prothorax and on the underparts somewhat foliaceous, free at the apex, a longitudinal depression, short in the middle, corresponding to the midrib of the leaf.

**SYRICHIVS SERVULUS.** *S. præcedenti* affinis, sed prothorace vage granulato, squamis normalibus; elytris minus cordatis, punctis striarum

nudis, pone granulum singulum squama elongata setiformi basi inserta. Long. 3 lin.

*Hab.* Dorey.

### NEDYMORA.

#### (Cryptorhynchinæ.)

*Rostrum* elongatum, tenuatum, nudum; *scrobes* præmedianæ, subobliquæ, infra marginem inferiorem oculorum desinentes. *Funiculus* 7-articulatus, articulis duobus basalibus longiusculis, cæteris gradatim brevioribus et latoribus; *clava* breviter ovata. *Oculi* parvi, rotundati, tenuiter granulati, antice haud approximated. *Prothorax* transversus, apice valde constrictus, tubulatus, paulo productus, utrinque antice rotundatus, postice parallelus, basi bisinuatus; lobis ocularibus nullis. *Scutellum* orbiculare. *Elytra* subtrigona, prothorace haud latiora, basi trisinuata, apice rotundata. *Pedes* antici majores; *femora* sublinearia, subtus dentata, antica elongata; *tibiæ* breves, compressæ, extus arcuatæ; *tarsi* articulis tribus basalibus conjunctim obconicis, articulo quarto exiguo. *Rima* pectoralis mesosterno limitata et metasterno impingens, apice aperta. *Metasternum* modice elongatum. *Abdomen* normale.

A genus with the habit of *Euthyrhinus*, but allied to the preceding, from which it differs in the characters of the metasternum and of the pectoral canal.

NEDYMORA VENTRICOSA. (Pl. VIII. fig. 1.) *N.* late ovata, picea, griseo-squamosa; capite inter oculos planato, fovea impresso, albido-squamoso maculis duabus fuscis notato; rostro pallide ferrugineo nitido, subtiliter vage punctato; antennis rufo-testaceis; prothorace antice valde constricto, supra sat fortiter punctato, punctis singulis squama magna obtectis, squamis anterioribus fusciscentibus, utrinque antice linea nivea verticali ornato; elytris basi paulo planatis, postice valde convexis, striato-punctatis, interstitiis elevatis; corpore infra pedibusque squamis albescentibus sat dense tectis. Long.  $2\frac{3}{4}$  lin.

*Hab.* Aru.

### ÆSYCHORA.

#### (Cryptorhynchinæ.)

*Rostrum* modice elongatum, depressum, paulo arcuatum, apicem versus nudum; *scrobes* præmedianæ, rectæ. *Scapus* brevis; *funiculus* 7-articulatus, articulis duobus longioribus, cæteris brevibus, triangulariter dilatatis, singulatim intus apice productis;

*clava* ovata, distincta. *Oculi* sat magni, laterales, grosse granulati. *Prothorax* antice angustior, utrinque rotundatus, apice productus, lobis ocularibus parum distinctis. *Elytra* prothorace vix latiora, cylindrica. *Femora* incrassata, infra dente acuto armata, postica longiora, pedunculata; *tibiæ* breves arcuatae, compressæ; *tarsi* subangusti, articulo basali duobus sequentibus conjunctim breviora. *Rima* pectoralis inter coxas antiquas protensa, apice subaperta. *Abdomen* normale. *Processus* intercoxalis triangularis.

There are some other unpublished species generically allied to the present from the Malayan archipelago; they will probably, from their habit—the elytra being scarcely broader than the prothorax—form a section apart, but allied, in Lacordaire's arrangement, to the preceding. The antennæ of this genus differentiate it from any other in this group.

*ÆSYCHORA NOTATICOLLIS*. *Æ.* cylindrica, picea, omnino dense griseo-squamosa; rostro quam prothorace vix longiore, castaneo, nitido, fere impunctato; antennis subferrugineis; funiculo sparse pubescente, apicibus articulorum intus fasciculatis; prothorace latitudine longitudini æquali, sat fortiter subvage punctato, plaga magna rufo-brunnea supra notato; scutello distincto; elytris striato-punctatis, punctis unisquamigeris, interstitiis parum convexis; corpore infra pedibusque squamis pallidioribus interjectis. Long. 5 lin.

*Hab.* Sarawak.

*BLEPIARDA VOLUTA*. *B.* modice subelliptica, supra pedibusque fusco-picea, griseo-squamosa; rostro æquilato (♂), apicem versus sensim angustiore (♀), fere obsolete carinato, funiculo sparse setosulo-piloso, articulis duobus basalibus æqualibus, primo (♂) curvato; prothorace valde transverso, basi breviter lineatim elevato, dorso tuberculis parvis quatuor munito, duobus apicalibus, duobus in medio transversim sitis; scutello rotundato, pallide subsericeo-squamoso; elytris subovatis, antice parallelis, striato-punctatis, interstitiis interrupte clavatis, vel quodammodo subtuberculatis; corpore infra nigro-piceo, sparse punctato, punctis unisquamigeris. Long.  $3\frac{1}{2}$  lin.

*Hab.* Dorey; Salwatty.

*BLEPIARDA VITIATA*. *B.* præcedenti similis, sed prothorace minus transverso, supra valde inæquali, tuberculis sex subfasciculatis, duobus apicalibus, quatuor in medio transversim sitis; scutello oblongo, concolori; elytris interstitiis tertio quintoque tuberculatis, utrinque magis fortiter punctatis, postice lateribusque saturate brunneis; corpore infra minus sparse punctato. Long.  $3\frac{1}{2}$  lin.

*Hab.* Aru.

The genus *Blepiarda* was described from a male specimen from Cape York. The female differs in the insertion of the antennæ being in the middle of the rostrum and in the shorter scape. The above two species depart from the type in having the two basal joints of the funicle of equal length; they are also not nearly so broad; another species is described from the Fiji Islands. The following species is not so strikingly homogeneous as its congeners, owing to its colour, its narrower outline, the prothorax not being depressed above, and the elytra being less convex posteriorly.

**BLEPIARDA NEOPHYTA.** *B. angustior*, sat dense albido-squamosa, pallide fuscescenti-maculata; rostro apicem versus sensim angustiore (♀), ferrugineo, nitido, subtiliter vage punctulato; antennis pallidioribus, funiculo articulo secundo quam primo paulo brevior, clava quam funiculo longior; prothorace inæquali, ad latera vage punctato, punctis squama ampla repletis, tuberculis parvis sex munito, 2 apicalibus, 4 in medio transversim sitis; scutello oblongo; elytris striato-punctatis, punctis unisquamigeris, interstitiis tertio quintoque tuberculatis, tuberculis fuscis, singulatim plaga alba præapicali notatis; corpore infra nigro, nitido, squamulis pallidis irroratis. Long.  $3\frac{1}{4}$  lin.

*Hab.* Dorey.

#### AMALTHUS.

#### (Cryptorhynchinæ.)

♀ *Rostrum* validum, arcuatum, apicem versus sat subito flectum; *scrobes* præmedianæ, obliquæ, ad oculos desinentes. *Oculi* subgrosse granulati. *Scapus* subclavatus, oculum attingens; *funiculus* 7-articulatus, articulis duobus basalibus obconicis, longitudine æqualibus, cæteris valde transversis: *clava* elongata, inarticulata. *Prothorax* subconicus, antice tubulatus, apice productus, basi bisinuatus, lobis ocularibus prominulis. *Elytra* prothorace fortiter latiora, basi depressa, postice convexa, lateribus paulo rotundata. *Femora* sublinearia, antica validiora et longiora, omnia dente parvo instructa; *tibiæ* subelongatæ, flexuosæ; *tarsi* normales. *Rima* pectoralis profunda, pone coxas antica protensa, apice subfornicata. *Metasternum* elongatum. *Abdomen* normale.

The male of the handsome species described below is unknown, but probably will be found to differ only in the more terminal *scrobes* and the longer scape. The genus is allied to *Blepiarda*,



but differs in the stout rostrum, the conical prothorax, with the elytra at the base considerably broader than the base of the prothorax, &c. The brown parts under a strong lens are seen to be sprinkled with minute scales.

**AMALTHUS INSIGNIS.** (Pl. VII. fig. 4.) *A. ovalis*, cinnamomeo-fusca, squamulis flavescentibus condensatis maculas speciosas formantibus; capite antice subdepresso; rostro squamoso, apicem versus nigro nitido; antennis nigris, sparse setulosis; prothorace utrinque in medio calloso, deinde paulo incurvato, basi latiore, lateribus apiceque flavescentibus; scutello elevato, rotundato; elytris quam latitudine plus sesquialongioribus, remote seriatim punctatis, sutura postica, interstitiisque 3. 5. 7. elevatis, illo quadri-, secundo trifasciculato, fasciculis brevibus elongatis, singulatim macula basali, altera pone humerum, tertiaque irregulari postice ornatis; corpore infra fusco-brunneo, in medio flavo-squamuloso; pedibus fulvo-squamosis, fusco-annulatis. Long. 6 lin.

*Hab.* Morty.

#### DÆTES.

##### (Cryptorhynchinæ.)

*Rostrum* validum, arcuatum, squamosum; *scrobes* antemedianæ, obliquæ, infra marginem inferiorem oculorum terminantes. *Scapus* oculum attingens; funiculus 6-articulatus, breviusculus, articulis duobus basalibus longiusculis, cæteris transversis; *clava* cylindrica, elongata, pubescens (ut videtur) inarticulata. *Oculi* laterales, rotundati, tenuiter granulati. *Prothorax* subconicus, apice productus gibbosus, lobis ocularibus nullis. *Elytra* ampla, prothorace multo latiora, utrinque subparallela, humeris rotundata. *Pedes* breves; *femora* incrassata, infra dente instructa; *tibiæ* rectæ, *tarsi* articulis duobus basalibus angustis breviusculis, tertio lato, quarto modice elongato. *Rima* pectoralis inter coxas anticas terminata, apice fornicata. *Metasternum* elongatum. *Abdomen* normale. *Processus* intercoxalis triangularis.

A very distinct genus, for which I am at present unable to suggest any alliance. My specimen is probably a female; the other sex might show that its affinities were with the *Mecistostylus* group.

**DÆTES ALBO-PICTUS.** (Pl. VIII. fig. 6.) *D. ovatus*, squamositate atra, niveo-maculata, dense indutus; capite nigro, supra oculos niveo, fronte profunde longitudinaliter sulcato; rostro utrinque vitta obliqua nivea ornato; antennis piceis; prothorace subtransverso, antice valde constricto, postice utrinque parallelo, gibbo apicali in medio fortiter

excavato, adlatera niveo-maculato; scutello orbiculari, niveo; elytris, basin versus perparum depressis, postice sensim declivibus, striato-punctatis, punctis parvis, interstitiis valde convexis, basi maculis exiguis 6-8, pone medium maculis majoribus fasciam arcuatam formantibus, apiceque plaga maxima, ornatis; pectore niveo-squamoso; abdomine plerumque nigro, nudo; pedibus nigro niveoque annulatis; tarsis albo-pilosis. Long. 8 lin.

*Hab.* Goram.

#### AMYDALA.

##### (Cryptorhynchinæ.)

*Rostrum* validum, breviusculum, rectum, basi latiore; *scrobes* medianæ laterales; *scapus* brevis, gradatim crassior, ante medium rostri insertus; *funiculus* 7-articulatus, articulis duobus basalibus longioribus, cæteris transversis; *clava* elongata, cylindrica. *Oculi* subgrosse granulati, antice remoti. *Prothorax* conicus, antice productus, basi truncatus, lobis ocularibus nullis. *Scutellum* invisum. *Elytra* elongato-obconica, valde convexa, prothorace basi vix latiora. *Pedes* mediocres; *femora* ampla, compressa, infra canaliculata; *tibiæ* rectæ, teretes; *tarsi* normales. *Rima* pectoralis profunda, post coxas anticas terminata, apice fornicata. *Abdomen* segmento primo lamina transversa instructo.

The first abdominal segment of the species described below is furnished with a broad, flat, somewhat cordiform plate, edged with a narrow, glossy, black, elevated line, trenching considerably on the second segment. Something of the same kind, but of a much slighter character, is seen in *Ampagia*, a near ally of this genus. Both genera, as well as *Bepharus*, belong to that section of Cryptorhynchinæ of which *Sympiezoscetus* is the type. This genus is at once differentiated by the form of the club; the species described below is remarkably like *Perissops mucidus* (*ante*, p. 194).

AMYDALA ABDOMINALIS. (Pl. VI. fig. 11.) *A. subelliptica*, nigra, squamis variis, plerumque griseis, omnino sat dense tecta; rostro apicem versus nudo nitido, subvage punctato; clava antennarum funiculo longitudine fere æquali; prothorace in medio plaga triangulari læte fulva ornato; elytris pone basin latioribus, maculis dilutioribus irroratis, regione scutellari plaga nigra nuda elevata, granulisque tecta, elongato-cordiformi notata; femoribus posticis supra elevatis et valde compressis; tibiis basi extus paulo productis; tarsis infra dense aureo-tomentosis. Long. 5 lin.

*Hab.* Queensland (Wide Bay).

## IXALMA.

## (Tachygoninæ.)

*Caput* parvum, exsertum; *rostrum* cylindricum, capite vix longius; *scrobes* foveiformes, medianæ. *Scapus* gracilis, oculum superans; *funiculus* 7-articulatus, art. basali longiusculo, subcrasso, cæteris sensim brevioribus ultimo quasi clava incipiente; *clava* perampla, longitudine funiculo æqualis, art. tribus laxis, ultimo adnato. *Oculi* prominuli, rotundati, a prothorace distantes. *Prothorax* conicus, basi apiceque truncatus, sulco apicali impressus. *Elytra* ampliata, subquadrata, humeris spina retrorsa armata. *Pygidium* liberum. *Pedes* inæquales, postici majores; *femora* anteriora et intermedia modice incrassata, dentibus infra instructa, femora posteriora maxima, pedunculata, in medio valde incrassata, dente magno triangulari infra armata; *tibiæ* graciles, anteriores et intermediae rectæ, posteriores curvæ; *tarsi* mediocres; *unguiculi* liberi, simplices; *coxæ* intermediae approximatae. *Epimera* metathoracis angusta. *Processus* intercoxalis subangustus, antice angulatus. *Abdomen* segmentis tribus intermediis æqualibus, ad latera valde arcuatis.

A very isolated form; but there can be no hesitation in placing it near *Dinorhopala*\*, Pasc., notwithstanding the structural difference in the approximation of the intermediate and posterior coxæ, contrasted with their extreme remoteness in *Dinorhopala*, as well as in *Tachygonus*, the only other members of the subfamily.

**IXALMA RUFESCENS.** (Pl. IX. fig. 1.) *I. rufo-aurantiaca*, pubes grisea tenuiter vestita; rostro basi æquilato; antennis testaceis, apicem versus rufis; prothorace subtiliter transversim plicato, supra pone medium leviter arcuato-excavato; scutello triangulari; elytris prothorace duplo latioribus, et fere triplo longioribus, fortiter sulcatopunctatis, interstitiis elevatis, tertio a sutura dente triangulari valido, compresso, in medio munito, in singulo elythro versus apicem callo obtuso sito; tarsis albidis, unguiculis rufis. Long. 2 lin.

*Hab.* Singapore.

## APHYODA.

## (Calandrinæ?)

*Caput* postice abrupte constrictum; *rostrum* longiusculum, basi cylindricum, capite paulo angustius; *scrobes* obliquæ. *Antennæ*

\* First taken near Rangoon; it also occurs in Mr. Wallace's collection from Sarawak.

in medio rostri insertæ; *scapus* modice elongatus, sensim crassior; *funiculus* 7-articulatus, articulis duobus basalibus breviusculis, cæteris transversis, gradatim crassioribus in clavam continuatis; *clava* ovalis, tenuiter pubescens. *Oculi* parvi, prominuli, orbiculares, tenuiter granulati. *Prothorax* elongato-subconicus, apice quam caput manifeste latior. *Elytra* elongata, prothorace vix latiora, basi singulatim producta. *Femora* linearia; *tibiæ* breves, rectæ, unco curvato terminatæ; *tarsi* breves, articulo tertio ampliato, bilobo, quarto elongato; *unguiculi* basi contigui. *Coxæ* anticæ sejunctæ. *Abdomen* normale. *Corpus* fusiforme.

Two at least very distinct species belong to this remarkable genus. They are covered with a pale thin crust having comparatively slight attachment to the derm, and, from the length of their bodies and their short legs, have a habit approaching the Brenthidæ. This genus, as well as the following, differs from the Calandrinæ in its seven-jointed funicle. They will probably constitute a distinct subfamily between Campyloscelinæ and Calandrinæ.

APHYODA DIURA. (Pl. VII. fig. 1.) *A. angusta*, indumento pallide griseo omnino tecta, setisque parce interjectis; rostro quam prothorace multo brevior; prothorace quam latitudine sèsquilongior; scutello parvo, transverso, nigro; elytris singulis in processum conicum productis; tarsis nigricantibus, subnudis. Long. 4 lin. (rost. incl.).

*Hab.* Dorey; Batchian; Ceram; Saylee.

The specimens from Ceram and Saylee differ slightly in the apices of the elytra from the type.

APHYODA BRENTHOIDES. *A. angustior*; indumento etc. ut in præcedente, sed rostro quam prothorace vix brevior; prothorace quam latitudine plus duplo longior; elytris basi manifeste latioribus, apicibus elongato-caudatis, subcontiguis. Long. 5 lin. (rost. incl.).

*Hab.* Waigiou.

#### ITHAURA.

(Calandrinæ?)

*Caput* abnorme, angustum, pone oculos fortiter constrictum; *rostrum* longiusculum, robustum, æquilatum, supra glabratum, lateraliter ab oculis sulcatum; *scrobæ* antemedianæ, valde obliquæ, infra rostrum fortiter excavatæ. *Oculi* magni, laterales, suborbiculati, grosse granulati, quasi tessellati. *Scapus* breviusculus, sensim incrassatus; *funiculus* 7-articulatus, articulo



primo brevi, secundo longiusculo, cæteris brevibus, gradatim latioribus; *clava* subglobosa, spongiosa. *Prothorax* elongatus, apice capite haud latior, antice angustior, basi rotundatus. *Scutellum* parvum. *Elytra* prothorace latiora, latitudine plus duplo longiora. *Pedes* mediocres; *femora* paulo incrassata; *tibiæ* compressæ, apice parum arcuatæ, bicalcaratæ; *tarsi* breves, articulo penultimo minusculo; *unguiculi* liberi, tenues, divergentes. *Coxæ* anticæ sejunctæ. *Abdomen* normale.

This genus is evidently an ally of the preceding, although very distinct. The species described below has a pale yellowish-clayey surface, smooth, with the appearance of being varnished.

**ITHAURA STRANGULATA.** (Pl. VI. fig. 2.) *I. oblonga*, depressa, indumento polito lutoso-silaceo omnino tecta; rostro quam prothorace brevior, supra vage subtiliter punctulato; antennis griseo-pubescentibus, parce setosulis; prothorace quam latitudine sesquolongiore, remote subtiliter punctulato, lateraliter vitta obscure fusca angusta notato; elytris subseriatim fortiter impresso-punctatis, basi interstitiis tribus paulo elevatis. Long. 4 lin.

*Hab.* Columbia.

**PROTOCERIUS FERVIDUS.** *P. elongato-ellipticus*, supra læte fulvo-brunneus, capite scutelloque saturatioribus, infra pedibusque atris, nitidis; antennis nigris; prothorace oblongo, antice tubulato, basi rotundato, supra glabro, impunctato; scutello elongato-triangulari; elytris prothorace paulo latioribus, postice angustioribus, apice obtuso-rotundatis, singulis striis quinque angustis, duabus extimis abbreviatis lineisque duabus punctatis ad latera insculptis, apice angustis nigro marginatis; pygidio conico, obscure fulvo-brunneo. Long. 15-19 lin.

*Hab.* Kumaon.

A narrower species than *P. colossus*, without any granulation on the prothorax, and of a bright yellow cinnamon-brown colour. *P. molossus*, Ol., is a good and perfectly distinct species, the original of which was supposed by M. Guérin Meneville to have been a female *colossus*, to which the head of a male had been attached. I have it from Celebes and Malacca.

## EXPLANATION OF THE PLATES.

## PLATE VI.

Fig. 1. *Dicordylus pupillatus*.

2. *Ithaura strangulata*; 2 *a*, side view of the head (not sufficiently accurate); 2 *b*, antenna; 2 *c*, fore tibia (the first tarsal joint is hidden by the tibia).

3. *Antinia eupleura*; 3 *a*, lateral view of the head.

4. *Lemosaccus notatus*; 4 *a*, fore leg (unfortunately reversed by the artist).

5. *Mitophorus vittatus*; 5 *a*, lateral view of the head (the dotted lines represent the carinæ mentioned in the type).

6. *Pachyrhynchus argus*.

7. *Bryochæta sufflata*.

8. *Platyomicus pedestris*.

9. *Cherrus Mastersii*.

10. *Tiphaura funerea*; 10 *a*, lateral view of the head and antenna.

11. *Amydala abdominalis*; 11 *a*, lateral view of the head; 11 *b*, left hind leg.

12. Antenna of *Blepiarda neophyta* (♀).

13. Head of *Episomus fimbriatus*.

14. Head of *Oreda*, Wh., n. sp. My specimen is labelled "Madagascar;" but as the genus is only known in New Zealand, I think there must be a mistake, and therefore that is not desirable to publish the species at present.

15. Antenna of *Æsychora notaticollis*.

16. Head of *Siteytes glabratus*.

## PLATE VII.

Fig. 1. *Aphyoda diura*; 1 *a*, lateral view of the head and antenna.

2. *Dezagia superciliaris*; lateral view of the head.

3. *Hexymus tuberosus*.

4. *Amalthus insignis*; 4 *a*, lateral view of the head; 4 *b*, antennæ.

5. *Ectyrsus villosus*; 5 *a*, fore leg; 5 *b*, lateral view of the head and antenna.

6. *Zeiona pulchella*; 6 *a*, fore leg; 6 *b*, lateral view of the head and antenna.

7. *Poropterus hariolus*.

8. *Scolithus acuminatus*.

9. *Hyllobius fasciatus*.

10. *Ectinura brentoides*.

11. *Agilaus pedestris*; 11 *a*, lateral view of the head and antenna; 11 *b*, fore tibia and tarsus (reversed, the tibia not broad enough); 11 *c*, claws.

12. *Omphasus æratus*; 12 *a*, lateral view of the head and antenna (the head ought to have been drawn nearly horizontal); 12 *b*, fore leg (reversed); 12 *c*, a claw.

## PLATE VIII.

- Fig. 1. *Nedymora ventricosa*; 1 *a*, lateral view of the head; 1 *b*, fore leg (reversed).  
 2. *Orochlesis annularis*; 2 *a*, lateral view of the head.  
 3. *Rebius latifasciatus*; 3 *a*, antenna.  
 4. *Panopides anticus*.  
 5. *Endymia vipio*; 5 *a*, fore leg (reversed); 5 *b*, antenna; 5 *c*, lateral view of the head.  
 6. *Dates albo-pictus*; 6 *a*, lateral view of the head; 6 *b*, antenna.  
 7. *Nechyrrus lemur*.  
 8. *Erebaces angulatus*.  
 9. *Perichius verrucosus*.  
 10. *Deretiosus aridus*; 13 *a*, lateral view of the head.  
 11. *Zeugenia histrio*.  
 12. A fore leg, front view (bad) of *Sybulus peccuarius*; 12 *b*, antenna.  
 13. Lateral view of the head of *Glyphagia sculpturata*.  
 14. Front view of the head of *Perissops iliacus*.

## PLATE IX.

- Fig. 1. *Ixalma rufescens*; 1 *a*, lateral view of the head and antenna; 1 *b*, hind leg.  
 2. *Diatassa phalerata*; 2 *a*, lateral view of the head and part of prothorax.  
 3. *Ozootenus jubatus*; 3 *a*, lateral view of the head and part of prothorax; 3 *b*, hind leg.  
 4. *Styanax carbonarius*; 4 *a*, antenna; 4 *b*, lateral view of the head; 4 *c*, mandibles.  
 5. *Hypermetra analis*; 5 *a*, lateral view of the head.  
 6. *Apries eremita*; 6 *a*, lateral view of the head and part of prothorax.  
 7. *Seleuca amicta*; 7 *a*, lateral view of the head.  
 8. *Niphades pardalotus*; 8 *a*, tarsus and part of tibia; 8 *b*, a claw.  
 9. *Alcides magister*.  
 10. *A. delta*, var.  
 11. *A. auritus*.  
 12. Head and part of prothorax of *Mitrephorus capucinus*.  
 13. Tarsus of *Alcides micronychus*.  
 14. Hind leg of *Nechyrrus satyrus*.  
 15. Head of *Glechinus talpa*; 15 *a*, antenna.
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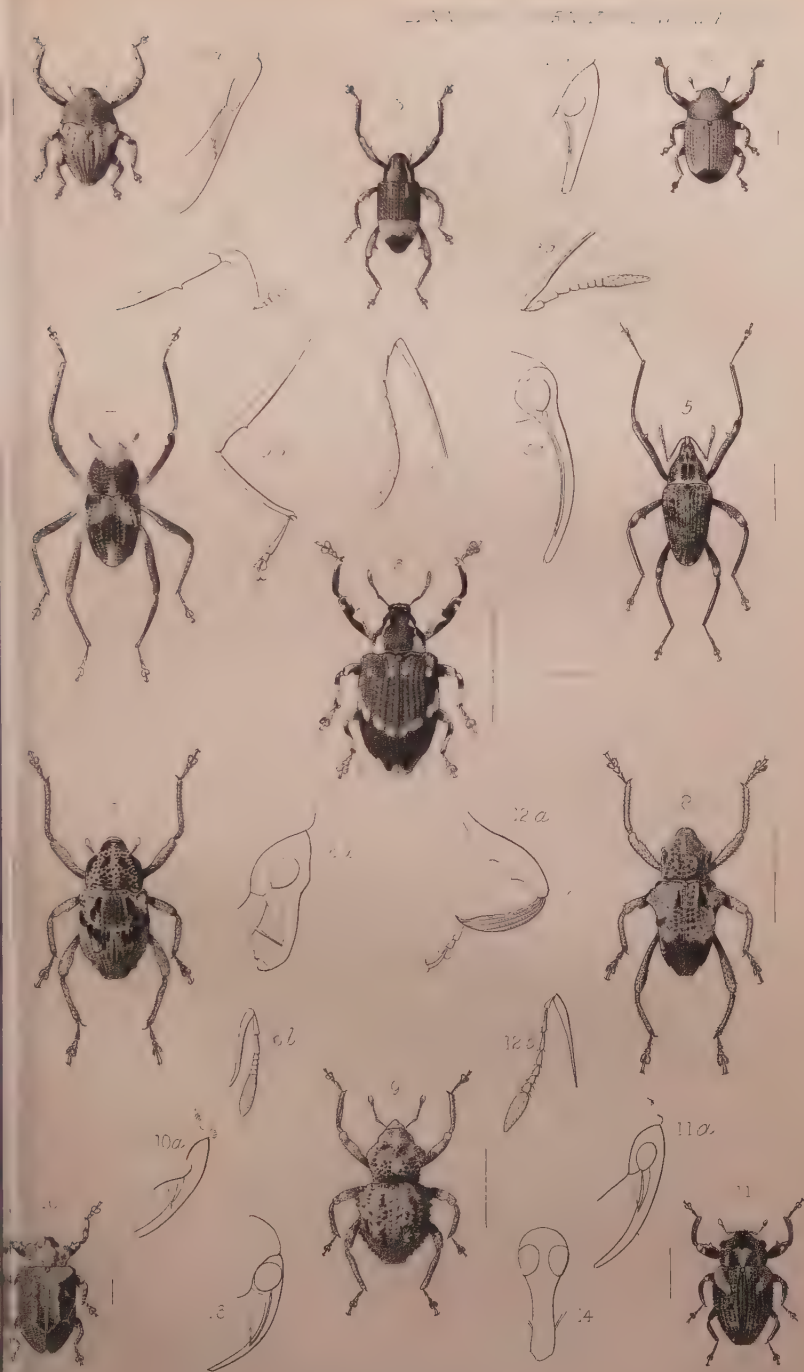




















An Attempt towards a Systematic Classification of the Family *Ascalaphidæ*. By R. M'LACHLAN, F.L.S., Sec. Ent. Soc.

[Read May 4, 1871.]

FOR some years I have been collecting materials with the hope that I might some day publish a monograph of this interesting Neuropterous family; but the difficulty of defining the limits of species, owing to their innate tendency to variation, and the absence, in many cases, of one sex, prove to me the impossibility of, at present, writing an exhaustive work. Collectors generally have paid very little attention to these insects; and without an examination of an extensive series from different localities, a safe generalization on specific forms could not be attempted. I have therefore drawn up the present paper as a sketch of my present knowledge of the family, and as an assistance to myself and others in investigating it.

A glance may here be taken at the progress made in the study of these insects. Linné, at the time of publication of the 12th edition of the 'Systema Naturæ,' knew of only two species, which he placed with *Myrmeleon*. A few years previously, and afterwards, such competent entomologists as Scopoli and the authors of the 'Wiener Verzeichniss,' deceived by external form, described two of the gay-coloured South-European species as *Papilio*s.

The genus *Ascalaphus*, which is synonymous with the family as it now stands, was instituted by Fabricius in his 'Systema Entomologiæ,' in 1776, and at the time of publication of the second volume of the 'Entomologia Systematica,' in 1793, he indicated six species, and one more in his 'Supplement' in 1798.

For a long time the progress was scarcely evident. Burmeister, in 1839, in his 'Handbuch der Entomologie,' enumerates only eighteen species as then known to him. In this work is what was probably the first attempt at dividing the old genus *Ascalaphus* into sections; and Burmeister in one instance indicates a divisional name (*Haploglenius*), which has since been adopted for a genus.

In 1842, Lefebvre, in Guérin's 'Magasin,' made the first essay at a generic splitting-up of *Ascalaphus*, and divided it into ten genera, under the names *Ptynx*, *Azesia*, *Amœa*, *Theleproctophylla*, *Proctarrelabris*, *Ascalaphus*, *Hybris*, *Acheron*, *Orphne*, and *Suphalasca*. This short paper shows great research and an

intimate knowledge of the structure of the family ; but in most cases he grouped many, and often discordant forms as divisions of his genera, without indicating any special generic type ; hence I have been compelled to an arbitrary adaptation of his views to the present state of our knowledge, carefully preserving, however, his names, and applying each to some one of the divisions he bracketed together under it.

Lefebvre, in the paper just examined, announced his intention of publishing a monograph of the group. I have every reason to believe that this was really completed in MS., and the illustrations prepared, and that it still exists in the possession of his family ; yet, from some cause or other, it was never published, though its writer lived for at least twenty-five years after making known his intention. The fact of its non-publication is much to be deplored.

Also in 1842 appeared the volume of the 'Nouvelles Suites à Buffon,' comprising Rambur's 'Histoire Naturelle des Névroptères. His "Ascalaphides" are divided into nine genera, viz. *Ascalaphus*, *Theleproctophylla*, *Puer*, *Bubo*, *Ulula*, *Cordulecerus*, *Colobopterus*, *Byas*, *Haploglenius* (nec Burm.), and *Azesia*. From the almost simultaneous appearance of Lefebvre's and Rambur's arrangement a risk of confusion ensued ; but that this was obviated is proved by the fact that Rambur criticises, and in some respects adopts, Lefebvre's views. Rambur enumerates and describes thirty-one species.

In 1848 Westwood, in the 'Cabinet of Oriental Entomology,' indicated a group under the name *Ogcogaster*.

In 1853 Walker completed the second part of the 'List of Specimens of Neuropterous Insects in the Collection of the British Museum:' including forty-one described in that work as new, he enumerates eighty-one species, placing them all under *Ascalaphus*, but indicating divisions. Like all the other Catalogues by this author, this shows an immense amount of bibliographical research, and as a compilation is very valuable ; but, like them also, it proves the author's incapacity for discriminating species or groups ; and, as a consequence, many of his names sink as synonyms of his own or previously described species. The descriptions are generally good, often excellent ; but there is no appreciation of affinities, and the whole work bears the impress of mechanical effort.

In 1860 Hagen published, in the 'Stettiner entomologische



Zeitung,' a synonymic list of the species of the restricted genus *Ascalaphus*. In 1866 the same author brought forward his 'Hemerobidarum Synopsis Synonymica' in the same publication. His generic synopsis of the family contains no new elements, and is an attempt at grouping the described species under the generic divisions already indicated by Burmeister, Lefebvre, Rambur, and Westwood. As a laborious compilation and index-list of names, this work is invaluable; but I have been unable to adopt the author's views in many cases. It was intended only as a starting-point, and, as such, admirably serves its purpose.

In 1868 Brauer, in the 'Verhandlungen der kais.-königl. zoologisch-botanischen Gesellschaft in Wien,' published his "Verzeichniss der bis jetzt bekannten Neuropteren im Sinne Linné's; erster Abschnitt." His arrangement of the family is only an echo of that of Hagen.

My examination of the family has resulted in its division into twenty-seven generic groups, including several forms not hitherto noticed. It may possibly be objected that I have carried subdivision to too great a length. To this I would reply that without doubt a still greater disintegration will become necessary. It must be remembered that a knowledge of almost any Neuropterous family may be considered half a century behind that of the more favoured orders, such as Coleoptera, where subdivision has been carried to great minuteness of distinction. And, for my part, I would decidedly express myself in favour of minute subdivision, rather than of the principle of retaining numerous species under one generic heading. Few, I imagine, now believe in the existence of groups sharply defined by nature, and co-equal in value, such as formed the ideals of the older authors; and, granting this, it is to me a far greater aid to memory to have many groups, each with a special name, than to be put to the inconvenience of retaining in memory the characters of multitudinous unnamed sections of one large genus: in the former case the name recalls the characters; in the latter the sections, indicated probably by numbers or signs, mix themselves inextricably.

An attempt to arrange the described species under the new generic divisions, and a recapitulation of twenty-three species diagnosed as new, results in about 103 species now known. The number as catalogued by Walker is, much reduced, owing to many

names sinking as synonyms. Many additional, but undescribed, species probably exist in various museums and private collections. I have taken no cognizance of museum or catalogue names without descriptions. The materials from which I have worked are:— (1) the very extensive collection of the British Museum; (2) the valuable collection in the Oxford Museum, especially interesting as containing a considerable portion of Mr. Bates's private Amazonian collections, for an opportunity of consulting which I am indebted to the courtesy of Professor Westwood; (3) the collection of Baron de Selys Longchamps, of Liège, which contains most of Rambur's types; and (4) my own collection.

#### GEOGRAPHICAL DISTRIBUTION.

The range of the family may be said to extend from between the parallels of  $40^{\circ}$ – $50^{\circ}$  N., and  $30^{\circ}$ – $40^{\circ}$  S.; but, as a rule, it is more abundantly represented within the tropics. The various generic groups exhibit a decided tendency to localization. In no case is the same group represented both in the Old and New Worlds. I give below an outline of distribution according to groups:—

Mediterranean District.—*Ascalaphus* (extending into Central Europe and Central Asia); *Bubo*, *Puer*, *Theleproctophylla*.

Asia.—*Idricerus* (India); *Helicomitus* (India); *Siphlocerus* (India); *Ogcogaster* (India); *Ascalaphodes* (India); *Glyptobasis* (India); *Acheron* (India, China); *Hybris* (India, China, Japan, Malayan archipelago); *Suphalasca*? (Malay archipelago).

Africa.—*Melambrotus* (South-west); *Tmesibasis* (South-east); *Cormodes* (West); *Helcopteryx* (South); *Proctarrelabris* (South); *Nephoneura* (South); *Encyoposis*, *Suphalasca*,?

Australia.—*Suphalasca*, *Acmonotus*.

America.—*Ulula*, *Orphne*, *Colobopterus*, *Cordulecerus*, *Haploglenius*, *Ptynx*.

#### HABITS, &c.

There is probably scarcely any group of insects of equal importance of which less has been recorded in a biological point of view. The numerous class of explorers, more or less disinterested in their intentions, find full occupation in geographical and ethnological subjects, with an occasional notice of some remarkable point in the higher branches of zoology. On the other hand, those travellers who avowedly make the collecting of natural-

history objects their especial business for a pecuniary object, are necessarily devoted principally to those groups that find the most admirers, and are too often compelled, not always willing, panderers to a collecting-mania, in which the biology of the species of the most desiderated orders is scarcely attended to, and that of even the most conspicuous forms in other groups wholly neglected. Hence the records of the earlier stages and habits of the *Ascalaphidæ* are extremely meagre. With regard to the conspicuous species of the European restricted genus *Ascalaphus*, the same remarks will obtain with almost equal force. As is usually the case, those entomologists resident in localities where the insects abound feel the objects too familiar to be worthy of investigation; so that, with one honourable exception, we are almost without records of the habits of species which, from their gaudy appearance, were originally considered Butterflies. Had not this pleasing illusion been dispelled, we should have found hosts of observers, minute in details, and critical to absurdity in their appreciation of the discoveries of their fellow entomologists.

The barely definable line of demarcation between the *Ascalaphidæ* and the more familiar *Myrmeleonidæ*, or Ant-lions, points to similarity of habit, which has been sufficiently proved. The larvæ of the former, however, *never* make pitfalls, which is a frequent custom with those of the latter.

Putting on one side several unimportant and vague remarks on larvæ supposed to belong to the *Ascalaphidæ*, the first detailed account of the habits of a species of this family is given in the 'Trans. Linn. Soc.' vols. xiv. & xv., by that careful observer the Rev. Lansdown Guilding. He described with much care the metamorphoses of a species found in the Island of St. Vincent, in the West Indies, which he named *Ascalaphus Macleayanus*, belonging to Rambur's genus *Ulula*. In vol. xiv. p. 140, he says, "Habitat solitarius, volatu diurno satis frequens in dumetis St<sup>i</sup> Vincentii; ramulis emortuis sæpe quiescit, hostesque colore fugit." In vol. xv. is an extract from the minute-book relating to the Meeting of June 6, 1826, in which we read at p. 510, "Animal insectivorum?, sæpe die quiescit in arbustis vetustis emortuis, cum antennis alisque ramo applicatis, abdomineque in angulum (more ramuli) extenso, sic hostes decipiens. Ova numero 64-75 lanceolato-elliptica cinerascens, apicibus puncto candido in extremitate ramulorum ponit imago; serie duplici alternatim agglutinans et circulis multis repagulorum ab hostibus defendens.

*Repagula elongata-pedunculata, subdiaphana, rufescentia.* Larva : —Abdomen ovale, complanatum, scabrum ; .....pectines utrinque decem atro ciliati, anticis duobus (alarum rudimentis?) curvis." And at p. 511 we are informed that "by the term *repagula* (barriers) Mr. Guilding designates certain attendants on the eggs, which he conceives to be without analogies in the animal creation. They are curiously placed in circles, and always on the extremity of a branch, so that nothing can approach the brood ; nor can the young ramble abroad till they have acquired strength to resist the ants and other insect enemies. The female may be seen expelling from her ovary these natural barriers with as much care as her real eggs." Typical examples of the perfect insect are contained in the Oxford Museum, with young larvæ ; and I imagine it is one of the latter that Prof. Westwood figures in his 'Introduction,' fig. 63, 20. It is much to be regretted that no one since Guilding's time has described the metamorphoses of American species of the family. The allies of his species are common enough in some parts of America, and a species so closely related as to have been considered identical is found in the Southern States ; why, then, does not some American entomologist give us some information respecting the extraordinary barriers by which the eggs &c. are protected ? That these are not present in Old-World species is certain, so far as observations have gone. If the barriers also "protect" the larvæ till they have acquired sufficient strength to protect themselves, one is tempted to ask on what these feed in the mean time ?

In the 'Verhandlungen der zoologisch-botanischen Gesellschaft in Wien,' for 1854, pp. 463-471, and 1855, pp. 479-482, Herr Brauer, so well known for his biological researches on various *Neuroptera*, records his observations on *Ascalaphus macaronius*, with explanatory figures. According to him, "The perfect insects fly only in the sunshine, very high in the air during calm weather ; their flight resembles that of *Zygæna* among the Lepidoptera, but is steadier. In the morning, and in cold rainy weather, they sit on stalks of grass with the wings folded roof-wise. They are then difficult to see, because they notice each movement of the observer, and turn slowly round the grass-stem, so that they always maintain the same concealment. The time of flight begins at the end of June, and lasts until the middle of August. Pairing takes place during flight. The male seizes



the female with the appendices of the last segment ; and both fall to the ground, and rest on some plant. Their position is then similar to that of the *Noctuidæ* and other *Lepidoptera*. A few days after pairing the female lays her eggs. These are arranged in two parallel rows, to the number of forty or fifty, on some plant, generally grass. When at large I have observed them to hunt chiefly *Lepidoptera* and small beetles." The young larvæ scatter themselves little from the position in which they are bred, and grow very slowly until the end of winter (though born in August); they are then very difficult to find, and appear to feed chiefly on *Aphides*, hiding mostly amongst moss and small stones. In the spring they begin to grow more rapidly, and take to larger food ; and in June they spin cocoons amongst low herbage, in which they change to pupæ. The larvæ have a process on the sides of each thoracic and abdominal segment, though far less developed than in *Ulula* ; and the possession of these processes seems to be one of the best characters whereby to separate the larvæ of the *Ascalaphidæ* from those of *Mymeleonidæ*, which latter have no processes. In the same Journal for 1867, p. 966, Brauer briefly alludes to a larva of this family from Rockhampton, which, I think, is probably that of a *Suphalasca*. He describes it as having only one long tooth to the mandibles.

I possess the eggs of a species of the family from Saugor, Central India, given to me by Mr. F. Moore, of the India Museum. They are arranged in two or three rows on a dead twig of mulberry, to the number of nearly sixty. These eggs produced larvæ thirteen days after they were discovered. The larva is about 3" in length, the head rather broader than long, with two produced eye-bearing tubercles in front, and very deeply concave on its hinder margin, extremely rough ; the mandibles with three large teeth and many smaller ones. Each thoracic and abdominal segment has a subcylindrical process on each side furnished with long and strong spines. Neither with these eggs nor with those of *Ascalaphus macaronius* is there any vestige of the *repagula* mentioned by Guilding.

A larva given to me by Mr. Bates, captured by him in the Amazon region, evidently belongs to the family, and may possibly be that of a *Ulula*. It is  $6\frac{1}{2}$ " long, without the mandibles (or  $8\frac{3}{4}$ " including those members), and nearly 5" broad at its broadest part. The mandibles have three equidistant long teeth, between which are very short tubercular teeth. The head is nearly quadrate and sca-



brous, deeply concave behind, the sides denticulate and fringed; the eyes are twelve in number, six on each side, placed on the produced anterior angles of the head. The thoracic and abdominal segments are each furnished with a long, slightly curved, flattened lamina, densely fringed with spines, the first thoracic lamina longer and broader than the others; the abdomen very broad and thin, somewhat transparent in the dry larva, convex above and concave beneath; the legs entirely hidden under it.

In an example of *Proctarrelabris annulicornis*, from Natal, in the British Museum, a note is attached in the handwriting of its captor, Mr. Guenzius, stating that the species hides by day in chinks of the bark of old trees, and at dusk flies about the trees hawking insects. An example of *Idricerus decrepitus*, from North India, in my collection, is ticketed (by Capt. A. M. Lang, R.E., who gave it to me) as having been taken in the twilight.

Mr. Bates, who had ample opportunities of observing these insects when on the Amazons, informs me that the species were most numerous in the dry sandy country of the Tapajos, and much rarer in the humid virgin forests of Pará and the Upper Amazons. Of the *Haploglenii* he says the flight is short but rapid in the shades of the forest in the daytime, the insects reposing with the wings expanded, as in *Libellula* (a most valuable observation), and resting head upwards. Of the *Ululæ* and *Colobopteri* he remarks that they are mostly found in dry woods and dry grassy savannas, resting during the day on twigs of dead trees or bushes, with the wings tectate, as in all genera excepting *Haplogenius*, and head downwards.

In the foregoing notes, I think, is incorporated every biological observation of any importance that has yet been made. Their paucity should stimulate observers to further investigations.

#### GENERIC CHARACTERS.

*Antennæ*.—The principal points to be noticed are the comparative lengths, form of the club, presence or absence of serration or denticulation in any portion of them (a character that can only be applied to the ♂; in the ♀ there is never either denticulation or serration), presence or absence of verticillate hairs on the basal portion, and, lastly, whether in the ♂ they are straight or nearly so, or present bendings or twistings of some portion.

*Eyes*.—Whether simple or divided by a groove into two por-

tions, and the comparative size of these portions. The eyes in the Schizophthalmous division are really double, the upper portion overlapping the under; if the upper portion be separated, the lower division looks like a small spherical ordinary eye.

*Thorax*.—Comparative robustness and amount of villosity.

*Abdomen*.—Length and disparity of form in the sexes; presence or absence of dorsal humps (for the ♂ only); and especially the presence or absence of anal appendices in the ♂, and, when present, their form.

*Legs*.—Comparative length and strength, and the length of the tibial spurs, as compared with the basal joints of the tarsi. (In this last character, as given under each genus, it is always the posterior legs that are referred to.)

*Wings*.—Size and shape, closeness or openness of the network. The base of the inner margin should always be particularly examined. In the anterior wings this portion varies very much: ordinarily there is a simple small excision at the extreme base, with the axillary angle more or less prominent; occasionally, however, the basal part of the inner margin has a long excision, rendering the wings almost petiolate; and frequently proceeding from this portion is a long tooth-like projection, in which case the wings are said to be "appendiculate:" this tooth is, in reality, the axillary angle standing out prominently in consequence of the margin beyond it being scooped out; when present it is always irrespective of sex (*cf.* Hagen in Stett. ent. Zeit. 1866, p. 373). In the posterior wings regard must be had to the outline of the basal portion of the posterior margin: in these wings also a point of structure in the neuration must be especially attended to; I allude to the lower cubitus ("la cinquième nervure" of Rambur); in most genera this nervure, near the base, presents a slight geniculation, from which proceeds an oblique nerve running into the underlying longitudinal nervure (the postcosta); occasionally the indication of this oblique nerve is very slight, and it then is scarcely distinguishable from the ordinary veinlets, only that its point of departure can be detected by the indentation of the cubitus above alluded to; occasionally also the deep excision of the inner margin, and consequent narrowing of the base of the wing, nearly obliterates both the oblique nerve and the postcosta; in a few (American) genera there is no indication whatever of this oblique nerve, and the postcosta is long and sinuous.

With regard to the sequence and affinities of the genera, I believe it to be impossible to rely upon any special characters in the imago alone, and consider that no thoroughly stable arrangement can be arrived at until a knowledge of the earlier stages and general habits can be acquired. One should rely more upon facies in the present crude state of the family as a guide to affinities. An arrangement based upon special characters would tend to widely separate forms which are evidently closely allied one to the other, and would place in juxtaposition those with little relationship. It seems probable that even the obvious character of the entire or divided eyes will eventually be found insufficient to maintain the existence of two divisions, however useful the character may appear at the present time.

I have given no characters derived from an examination of the parts of the mouth, such examination being almost impossible in dry examples.

This appears to be the best place for a discussion of the affinities of the anomalous genus *Stilbopteryx*, Newman (*Azesia*, Lefebvre). Lefebvre placed it unhesitatingly in the *Ascalaphidæ*, and succeeding writers have pretty generally followed him. It should be remarked, however, that the most obvious character, the very short antennæ, was not observed by him, in consequence of these organs being wanting in his type; in his figure he supplied ideal long antennæ, as is usual in the family. Hagen, in 1866 (Stett. Ent. Zeit. p. 372), transferred the genus to the *Myrmeleonidæ*, stating that he did so in consequence (especially) of the character of the reticulation of the poststigmatal area, which is made up of numerous small *oblong* cellules, whereas in the *Ascalaphidæ* these cellules are ordinarily many-angled. I fail to appreciate this character to the extent that my friend Dr. Hagen does, because in some *Ascalaphidæ* (e. g. *Orphne*) there is a decided tendency to this oblong building of the cellules, and, on the other hand, I do not find in any *Myrmeleonidæ* a full equivalent of the cell-structure exhibited in *Stilbopteryx*. The form of the palpi seems certainly more analogous to that of the *Ascalaphidæ* than to most of the *Myrmeleonidæ*; and the facies of the genus reminds one much of some species of *Suphalasca* that inhabit the same districts.

It is, then, with much hesitation that I have omitted *Stilbopteryx* from the *Ascalaphidæ*; that I have done so is solely owing to the formation of the antennæ, which finds no parallel in that

family, believing, nevertheless, that the discovery of the earlier stages will reinstate it in its original position\*.

### SPECIFIC CHARACTERS.

The ordinary minor differences in form, and the colours of the various members, should be taken into consideration. As this is not intended as a monograph of species, I shall say little on this subject, save to enjoin caution. I have already remarked that the species appear to vary much according to locality in some cases. How far this variation may entitle the forms to specific right, or only to the minor position of "varieties," cannot be considered with the materials at present in hand. Another very important matter is the coloration of the wings. In many species in which the wings are *tinted*, it is certain that the full amount of coloration is not acquired until after a considerable time, as in many *Libellulidæ*. These insects are probably comparatively long-lived, and the tinting would seem to be the result of a kind of oxidation of the membrane of the wing, that proceeds gradually. Very great caution should be exercised in considering the comparative robustness or obesity of the ♀ abdomen. It is probable that many females live, for the enjoyment of life, for some little time after the ova are deposited; and in these "spent"

\* [Since these remarks were written, I have discovered a character which tends to prove that *Stilbopteryx* has really more relationship to the *Myrmelionidæ* than to the *Ascalaphidæ*. At the extreme base of the inner margin of the posterior wings of the male is a corneous semipedunculate knob. This is present in the males of *Palpares*, *Acanthaclisis*, &c., but, I think, is always absent in *Ascalaphidæ*.]

I am not prepared to say how many species of *Stilbopteryx* may exist. All that I have seen seem to pertain to the same species, differing in the spotting of the sides of the abdomen according to sex. All these I refer to *costalis*, in the ♂ of which the abdomen is somewhat geniculate at the fourth segment, and on the dorsum of this segment there is a protuberance covered with short black spines. Dr. Hagen, however (in litt.), believes he has four species. One of these, from Western Australia, is very extraordinary, and has (I presume in the ♂ only) an enormous protuberance on the base of the dorsum of the abdomen, having some analogy to the formation seen in *Acmonotus incusifer*, which latter certainly is of the *Ascalaphidæ*. The "nov. sp. Coll. M'Lachlan," mentioned by Hagen in *Stett. Zeit.* 1866, p. 460, and stated on the authority of a verbal communication from me to him, some years since, as coming from Java, is probably only *costalis*. I captured it myself, in 1855, on board ship. I can find no note in my journal concerning it, and now think that it must have flown on board off the coast of New South Wales, and not when near the island of Java, as I formerly supposed.



females the abdomen often shrinks to a less size than that of the male, although before oviposition commenced it was of enormous bulk.

I would here explain that in the diagnoses that follow, by the term "*Frons*" I mean the vertical face of the head; "*Vertex*" includes the whole upper surface of the head from the base of the antennæ to the posterior margin; "*Occiput*" refers to the back portion of the head *behind* the eyes. The measurements are in *English lines* ( $12''' = 25$  millimetres).

*Tabula Generum.*

DIV. I. HOLOPHTHALMI.

(Oculi integri.)

A. Alæ anticæ ad basin appendiculatæ.

a. Antennæ alis multo breviores.

b. Alæ anticæ posticæque ad basin perangustatæ, inde dilatæ, dense reticulatæ . . . . . *Ptynx*, Lefebv.

bb. Alæ anticæ ad basin paullo angustatæ, aperte reticulatæ, (*vide infra*) . . . . . *Haploglenius*, Burm.

bbb. Alæ perangustatæ . . . . . *Melambrotus*, n. g.

aa. Antennæ alis æquales vel longiores. Alæ variegatæ, ad basin angustatæ, inde dilatatæ . . *Tmesibasis*, n. g.

B. Alæ anticæ haud appendiculatæ.

c. Alæ, insecto haud volitante, fere horizontaliter extensæ.

Prothorax maris supra in valvulam magnam postice productus. Abdomen subgracile. *Haploglenius*, Burm.

cc. Alæ, insecto haud volitante, longitudinaliter deflexæ.

Prothorax maris simplex.

d. Alæ latæ. Corpus valde robustum, breve.

*Cormodes*, n. g.

dd. Alæ angustiores. Corpus gracilius, longius.

*Idricerus*, n. g.

DIV. II. SCHIZOPHTHALMI.

(Oculi divisi.)

A. Ramulus obliquus cubiti inferioris in alis posticis deest; postcosta elongata, sinuata. (Genera Americana.)

a. Alæ anticæ ad basin appendiculatæ; posticæ maris prope basin valde dilatatæ. Antennæ alis æquales vel longiores.

*Orphne*, Lefebv.



aa. Alæ anticæ haud appendiculatæ.

b. Alæ latæ: posticæ ad basin dilatatæ; margine anali plus minusve exciso vel sinuato. Calcaria tibiæ posticarum articulis tarsorum 1° et 2° simul sumptis vix longiora.

*Cordulecerus*, Ramb.

bb. Alæ plerumque angustiores: margine anali posticarum integro, convexo. Antennæ alis plerumque breviores, clava brevi. Calcaria tibiæ posticarum articulis tarsorum 1°, 2°, 3°que simul sumptis vix longiora.

*Ulula*, Ramb.

bbb. Alæ elongatæ, angustatæ, posticæ haud dilatatæ; margine anali ante basin plerumque profunde exciso, ad basin dilatato. Antennæ alis æquales vel longiores, ad basin pilis verticillatis plus minusve instructæ; clava angustata, elongata. Calcaria tibiæ posticarum articulis tarsorum 1°, 2°, 3°, 4°que simul sumptis vix longiora.

*Colobopterus*, Ramb.

B. Ramulus obliquus cubiti inferioris in alis posticis cum postcosta conjunctus (interdum fere oblitteratus), hæc brevior.

α. Alæ anticæ ad basin appendiculatæ.

β. Antennæ ad basin pilis verticillatis instructæ.

*Nephoneura*, n. g.

ββ. Antennæ pilis verticillatis haud instructæ; parte basali maris paullo arcuato, intus denticulato.

*Glyptobasis*, n. g.

αα. Alæ anticæ haud appendiculatæ.

γ. Antennæ ad basin pilis verticillatis instructæ.

δ. Abdomen maris subgeniculatum, ad apicem lateraliter membranaceo-alatum; appendicibus brevibus, divaricatis ..... *Helcopteryx*, n. g.

δδ. Abdomen maris simplex; appendicibus elongatis, forcipatis ..... *Proctarrelabris*, Lefebv.

γγ. Antennæ pilis verticillatis haud instructæ.

\* Abdomen maris appendicibus instructum.

† Abdomen maris tumore permagno conicali supra ad basin instructum; appendicibus brevibus cylindricis, vix forcipatis. Alæ perangustatæ.

*Acmonotus*, n. g.

†† Abdomen in utroque sexu simplex.

‡ Appendices elongatæ, forcipatæ, processu intus in medio instructæ.

§ Abdomen fœminæ appendicibus foliaceis instructum..... *Theleproctophylla*, Lefebv.

§§ Abdomen fœminæ appendicibus haud instructum ..... *Bubo*, Ramb.

†† Appendices simplices.

1. Antennæ maris ad basin arcuatæ.

*Hybris*, Lefebv.

2. Antennæ maris in parte apicali flexuosæ et intus subseriatæ. Alæ elongatæ, haud dilatatæ.

*Siphlocerus*, n. g.

3. Antennæ maris regulariter paullo curvatæ, intus denticulatæ. Alæ breves, subtriangulares, maris partim opacæ..... *Ascalaphodes*, n. g.

4. Antennæ maris fere rectæ simplices.

a. Abdomen maris fere glabrum, valde inflatum; appendicibus robustis. Alæ vix dilatatæ.

*Encyoposis*, n. g.

aa. Abdomen maris fere glabrum, subcylindricum; fœminæ valde dilatatum. Alæ paullo dilatatæ, maculatæ .. *Ogcogaster*, Westw.

aaa. Abdomen breve, hirsutum. Alæ breves, subtriangulares, pictæ, sæpius partim opacæ; margine costali ad basin dilatato. Appendices breves, graciles .. *Ascalaphus*, F.

\*\* Abdomen maris appendicibus haud instructum.

× Antennæ maris in dimidio basali flexuosæ et pilis fasciculatis extus instructæ. Alæ elongatæ. Abdomen fere glabrum ..... *Helicomitus*, n. g.

× × Antennæ maris ad basin intus denticulatæ. Alæ elongatæ, dilatatæ. Abdomen maris perelongatum.

*Acheron*, Lefebv.

× × × Antennæ maris simplices.

⊙ Alæ elongatæ, subæquales, vix dilatatæ. Abdomen modice elongatum. *Suphalasca*, Lefebv.

⊙ ⊙ Alæ valde inæquales, subtriangulares. Abdomen breve, lateraliter valde hirsutum.

*Puer*, Lefebv.

It is impossible to draw up a table that shall apply intelligibly to both sexes; and as the generic characters depend so greatly upon sexual differences in formation of antennæ, abdomen, &c.,

it is very desirable that the outline characters that follow in the consideration of each genus should be consulted. Tables are matters of great convenience; but if they be in all cases implicitly relied upon for determining genera or species, confusion must ensue.

The exigences of a tabular arrangement have widely separated genera that are closely allied one to the other. The affinities of the various genera may be indicated in the following manner:—

Division HOLOPHTHALMI.—*Haploglenius*. *Ptynx*.———*Melambrotus*.———*Tmesibasis*.———*Cormodes*. *Idricerus*.

Division SCHIZOPHTHALMI.—*Cordulecerus*. *Ulula*.———*Orphne*. *Colobopterus*.———*Acmonotus*. *Suphalasca*.———*Bubo*. *Theleproctophylla*. *Siphlocerus*. *Helicomitus*.———*Encyoposis*. *Ogcogaster*.———*Glyptobasis*. *Acheron*. *Hybris*.———*Nephoneura*. *Proctarrelabris*. *Helcopteryx*.———*Puer*. *Ascalaphodes*.———*Ascalaphus*.

#### Division I. HOLOPHTHALMI.

##### Genus HAPLOGLENIUS, *Burmeister*.

(*Amœa*, Lefebv.; *Byas*, Ramb.)

*Wings* extended nearly horizontally in repose, almost as in *Libellula*, but a little elevated; long, and generally rather broad, the basal portion never much narrowed; the anterior pair varying in the formation of the basal portion of the inner margin, which has either a long but slight excision with a rather prominent axillary angle, the same with the angle produced into a broad triangular tooth, or regularly convex with the angle obsolete; network open; pterostigma very large.

*Antennæ* equalling half the length of the wings, or longer or shorter than the half; club varying, but more or less elongate.

*Thorax* slightly villose; in the ♂ the prothorax is produced above posteriorly into a valve, which fits over a concave space in the front portion of the mesonotum.

*Abdomen* moderately long, slender; in the ♂ there is sometimes a pair of minute lateral appendices before the apex.

*Legs*, with the spurs of the posterior tibiæ scarcely so long as the first two tarsal joints.

*Hab.* Central and South America.

Much confusion has existed with regard to this genus, which

is a *very* natural one, notwithstanding its variability of character in the wing-formation. The position of the wings in repose is unique in the family, as is also the singular formation of the prothorax in the ♂. Much of this confusion is owing to Rambur and others having wrongly understood Burmeister's species, and confounded one of them with the *Ascalaphus appendiculatus* of Fabricius. The genus *Byas* of Rambur is certainly identical with *Haploglenius*, as is also *Amœa* of Lefebvre.

### *Species.*

The species are without doubt numerous, but their differentiation is very difficult, owing to insufficient materials. The best characters exist in the comparative lengths of the antennæ, and in the formation of the wings, especially with regard to the shape of the basal portion of the inner margin of the posterior pair. The smaller species (*arenosus* and allies) are comparatively much more robust than the larger; and in them the prothoracic valve of the ♂ is less developed, and the hind wings, from the point of termination of the cubiti in the inner margin, become suddenly greatly dilated; and in these the club of the antennæ is less elongate. The males appear to be less numerous than the females, judging from the collective series of examples that have examined.

1. H. COSTATUS, *Burmeister*. (*Ascal. costatus*, *Burm. Handb.* ii. p. 1000.—*A. luteus*, *Walk. Cat. Brit. Mus. Neurop.* p. 450.—*A. circumflexus*, *Walk. op. cit.* p. 451.—*A. contrarius*, *Walk. op. cit.* p. 452.) Antennæ alarum dimidio multo longiores, rufæ, vel rufo-fusæ; clava infuscata. Frons vertexque fusco-villosi. Thorax griseo-fuscus, infra utrinque flavo bistrigatus; ♂ prothoracis valvula paullo elevata, saturate fusca, margine libero fere semicirculari anguste albo. Pedes flavidi; tarsis nigricantibus; femoribus tibiisque anticis intermediisque supra fuscescentibus. Abdomen griseo-fuscum; in ♂ appendicibus parvis ante apicem instructum. Alæ sat latæ, ad apicem acutæ, vix falcatæ, vitreæ, vel interdum testaceo paullo tinctæ; ad apicem (in ♀) plerumque late testacæ; area subcostali et interdum (præcipue in ♀) area costali infuscatis; pterostigmate albido vel flavo-albido, pallide venato; venis venulisque nigris; margine interiore anticarum ante basin leviter exciso; angulo axillari paullo producto. Long. corp. 15–20''; exp. alar. 42–50''; postic. 36–43''.

Apparently very common in the Amazon region, and widely spread in Brazil. I have it from localities as widely separated as

Pebas on the Upper Amazons and Parana in South Brazil, without differences that seem to be specific. According to information kindly furnished by Dr. Hagen, who possesses the type, this is certainly Burmeister's species.

2. *H. FLAVICORNIS* (*De Selys, in litt.*), n. sp. Antennæ alarum dimidio vix longiores, omnino flavæ. Thorax abdomenque fusca, ille infra albidus. Pedes pallide flavi; tarsis fuscescentibus. Alæ latæ, fere vitreæ, ad apicem obtusæ; area costali subcostalique infuscatis; pterostigmate pallide infuscato, nigro-venato; anticarum margine interiore ante basin leviter exciso, angulo axillari in dentem triangularem producto (alæ hoc modo appendiculatæ) (♀). Long. corp. 12''; exp. alar. antic. 41'', postic. 39''.

*Hab.* Cuernavaca, Mexico. In the collection of Baron de Selys Longchamps.

This fine species differs from all others in the appendiculate anterior wings, though otherwise it is allied to *costatus* and other neighbouring forms.

3. *H. MICROCERUS*, *Rambur*. (*Byas microcerus*, *Ramb. Névropt.* p. 362.)

*Hab.* Antilles.

Unknown to me. I have seen no species that appears absolutely to accord with Rambur's description.

4. *H. TERMINALIS*, nov. sp. Antennæ alarum dimidio æquales, vel vix breviores, testaceæ; clava obscuriore. Frons vertexque fusco-villosi. Thorax griseo-fuscus, indistincte flavido varius, infra sparse cano-pilosus; ♂ prothoracis valvula paullo producta, auriformi, margine libero fere semiovato. Pedes sordide flavid; tarsis nigris. Abdomen fuscum. Alæ angustatæ, ad apicem subacutæ, vitreæ; margine costali anticarum (area costali subcostalique), apicibusque omnium late venuste brunneis; venis venulisque brunneis; pterostigmate magno, albido, pallide venato; margine interiore anticarum ante basin regulariter convexo, angulo axillari fere obsoleto. Long. corp. 19''; exp. alar. antic. 38'', postic. 35''.

*Hab.* Tapajos (*Bates*). In the British and Oxford Museums.

A pretty species, remarkable for its narrow wings, the apices of which are broadly brown in both sexes.

5. *H. LEUCOSTIGMA*, *Walker*. (*Ascal. leucostigma*, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 195.) Antennæ alarum dimidio breviores, rufo-fusæ; clava obscuriore. Frons vertexque fusco-pilosus. Thorax griseo-fuscus, vix flavo-variis. Pedes griseo-flavi; femoribus tibiisque supra fuscescentibus; tarsis nigris, articulo ultimo ad apicem rufo-testaceo. Abdomen griseo-fuscum. Alæ latæ, ad apicem subobtusæ, vitreæ; margine antico anticarum (area costali



subcostalique) pallide fusco; venis ramulisque fusco-nigris; pterostigmate magno, albo, pallide venato; margine interiore anticarum ante basin regulariter convexo, angulo axillari fere obsoleto (♀). Long. corp. 18''; exp. alar. antic. 43'', postic. 38''.

*Hab.* Amazons (Bates). In the British and Oxford Museums.

6. *H. ALBISTIGMA*, Walker. (Ascal. albistigma, *Walk. Cat. Brit. Mus. Neurop.* p. 452.) Antennæ alarum dimidio paullo breviores, testaceæ; clava fuscata, intus ad apicem flavida. Frons cervino-villosus. Thorax rufo-griseus, infra utrinque flavo-vittatus, flavo-varius. Pedes flavi; femoribus anticis intermediisque vix fuscescentibus; tarsis nigris. Alæ latæ, fere vitreæ; apicibus obtusis, late testaceis; pterostigmate albo, pallide venato: anticarum area costali subcostalique infuscatis, margine interiore ante basin regulariter convexo, angulo axillari fere obsoleto: posticæ anticis angustiores, margine antico (apicem versus excepto) haud tincto (♀). Exp. alar. antic. 40'', postic. 39''.

*Hab.* Honduras.

7. *H. SUBCOSTATUS*, Burmeister. (Ascal. subcostatus, *Burm. Handb.* ii. p. 1000.)

*Hab.* Brazil.

I cannot apply Burmeister's description, or a more explicit account of the characters of the insect received from Dr. Hagen, to any species I have seen, with absolute certainty. Nevertheless I think the species probably identical with the next-noticed, *H. injurius*. Burmeister states he had seen several *males*. However, I believe he did not know the male of either *costatus* or *subcostatus*. His types possess no prothoracic valve; neither does any specimen of *Haploglenius* in Hagen's collection, as he informs me; hence I doubt not that all are females.

8. *H. INJURIUS*, Walker. (Ascal. injurius, *Walk. Cat. Brit. Mus. Neurop.* p. 447.) Antennæ alarum dimidio æquales, fuscæ, ad basin flavæ; clava nigra, extus supra infraque ochracea. Frons cervino fuscoque villosus. Thorax obscure testaceus, griseo-varius. Pedes griseo-flavidi; tibiis subtus fusco-lineatis; tarsis piceo-nigris. (Abdomen mutilatum.) Alæ elongatæ, sat latæ, obtusæ, vitreæ; venis venulisque nigris; pterostigmate pallide flavo, nigro-venato: margine interiore anticarum ante basin fere regulariter convexiusculo, angulo axillari obtuso (♀). Exp. alar. antic. 40'', postic. 37''.

*Hab.* Brazil.

9. *H. DAMNOSUS*, Walker. (Ascal. damnosus, *Walk. Cat. Brit. Mus. Neurop.* p. 449.) Antennæ alarum dimidio longiores. Thorax fusco-flavoque varius. Pedes flavi; tibiis extus fusco-lineatis; tarsis nigris.

Abdomen fuscum, infra pruinatum. Alæ breves, latæ, posticæ basin versus valde dilatatæ; margine antico (area costali subcostalique) pallide flavido tincto; pterostigmate pallide flavido, nigro-venato (♀). Long. corp. 15''; exp. alar. antic. 35'', postic. 32''.

*Hab.* Brazil?

This species connects the group of *costatus* with that of *arenosus*.

10. *H. INIQUUS*, Walker. (*Ascal. iniquus*, Walk. Cat. Brit. Mus. Neurop. p. 448.) Antennæ alarum dimidio paullo longiores. Frons nigro-villosus. Thorax supra fulvo-fuscoque varius, infra albo-pruinatus. Pedes albidus; tibiis extus fusco-variis. Abdomen fulvum, supra nigro geminato-punctatum. Alæ vitreæ, pernitidæ, venuste iridescentes; venis venulisque nigris; pterostigmate brunneo, nigro-venato: anticæ elongatæ, paullo angustatæ; posticæ basin versus valde dilatatæ, apicem versus angustatæ (♀). Long. corp. 17''; exp. alar. antic. 34'', postic. 29''.

*Hab.* Villa Nova, Amazons (Bates).

11. *H. ARENOSUS*, Walker. (*Ascal. arenosus*, Walk. Cat. Brit. Mus. Neurop. p. 450.) Antennæ nigro-piceæ, alarum dimidio paullo longiores; clava nigra, infra ochraceo-suffusa. Frons fulvo-piceoque villosus. Thorax fuscus, supra utrinque testaceus, infra utrinque late flavidus. Pedes testacei; tarsi nigris. Abdomen brunneum, basin versus cinereo-villosum (thorax abdomenque interdum fere omnino albo-pruinato). Alæ vitreæ, obtusæ, sat latæ; venis venulisque nigris; pterostigmate flavo, nigro-venato. Long. corp. 14''; exp. alar. antic. 27-32'', postic. 24-29''.

*Hab.* Amazons (Bates).

I think it very possible that *arenosus*, *iniquus*, and *impediens* are forms of one species; but this can only be decided by the investigations of future observers. Mr. Bates paid but little attention to the *Neuroptera*. In other orders he proved incontestably that, in the regions he explored, different localities presented local forms that to all intents and purposes are entitled to be considered distinct: this may also obtain in the *Ascalaphidæ*. *H. iniquus* and *impediens* certainly appear to have the wings much more glossy than *arenosus*; and *iniquus* especially has narrower anterior and more dilated posterior wings.

The prothoracic lobe of the male in *arenosus* is much less evident than in that of the group of *costatus*: it is smaller, and so closely applied over the front portion of the mesonotum as to be scarcely distinguishable from the anterior lobe of that segment.

12. *H. IMPEDIENS*, Walker. (Ascal. impediens, *Walk. Cat. Brit. Mus. Neurop.* p. 449.) Antennæ alarum dimidio paullo longiores, nigræ; clava infra in medio flava. Frons cervino-fuscoque villosus. Thorax griseus, supra vittis duabus longitudinalibus flavis, infraque vitta utrinque lata flavo-albida, ornatus. Pedes pallide flavidi; femoribus, tibiisque extus fuscis; tarsis nigris. Abdomen fuscum, supra utrinque flavido-vittatum. Alæ breves, latæ (posticæ basin versus valde dilatatæ), vitreæ, pernitidæ, venuste iridescentes; venis venulisque nigris; pterostigmate pallide flavo, nigro-venato. Long. corp. 13''; exp. alar. antic. 33'', postic. 29''.

*Hab.* Para (*Bates*).

13. *H. IMMACULATUS*, Olivier. (Ascal. immaculatus, *Oliv. Encyc. Méthod.* iii. p. 246.)

*Hab.* South America.

Olivier certainly had a species of *Haploglenius* before him when he wrote his description; but it is impossible to identify it. His remark that "Les ailes de cet insecte lui donnent un peu l'air d'une libellule," has more significance than he probably intended, when the position of the wings in repose is taken into consideration.

#### Genus PTYNX, Lefebvre.

(*Haploglenius*, *Ramb. nec Burm.*)

*Wings* elongate, narrow, the two pairs nearly equal in length, the posterior pair somewhat narrower; the basal portion longly excised on the inner margin, and very narrow: anterior pair appendiculate; posterior pair with a slight dilatation at the extreme base of the inner margin: network very close; the neuration furnished with strong hairs; and there are also strong but short hairs on the membrane of the cellules, especially in the apical portion.

*Antennæ* short, scarcely more than half the length of the wings, robust; club short and broad.

*Thorax* hairy.

*Abdomen* slender in the ♂, acuminate, hairy, with a pair of very short, somewhat spoon-shaped, semicircular terminal appendices: more obese and shorter in the ♀.

*Legs* with the spurs of the posterior tibiæ nearly equalling the first three tarsal joints.

*Hab.* Southern United States.

Lefebvre refers *costatus* of Burmeister to this genus as the type; but I believe he misunderstood Burmeister's insect.

*Species.*

I am acquainted with two species, as under:—

1. *P. APPENDICULATUS*, *Fabricius*. (*Ascal. appendiculatus*, *Fab. Ent. Syst.* ii. p. 96; *Hag. Stett. ent. Zeit.* 1863, p. 376.—*Haplogl. appendiculatus*, *Ramb. Névropt.* p. 363.—*Ptynx costatus*, *Lefebv., Guérin's Mag.* 1842, nec *Burm.*) Antennæ rufo-piceæ; clava infuscata. Thorax fuscus, supra rufo-varius, fusco-hirtus; infra utrinque flavidus. Pedes flavi; tarsi infuscatis. Abdomen supra testaceo fuscoque varium, fusco-hirsutum; infra flavidum, vittis tribus nigris, interruptis, ornatum. Alæ subvitreæ; area costali subcostalique (illa pallidiore) brunneis; pterostigmate brunneo, subobsoleto; venis venulisque brunneo-testaceis, nigro-hirsutis. Exp. alar. 41'''.

*Hab.* Georgia (and probably other Southern States).

2. *P. JUVENILIS*, nov.sp. Antennæ nigro-piceæ; clava nigra. Thorax niger, supra flavo-maculatus, fusco-villosus, infra utrinque flavus, cano-villosus. Pedes fusci; femoribus tibiisque flavo-lineatis; tarsi nigro-piceis. Alæ subvitreæ; area subcostali infuscata; pterostigmate nigro-notato; venis venulisque nigris. Exp. alar. 34'''.

*Hab.* Texas (*Belfrage*). In my collection.

Much smaller than *appendiculatus*, and evidently distinct.

Genus *CORMODES*, n. g.

*Wings* elongate, rather broad, nearly equal, margins parallel, apex obtuse; anterior pair obliquely excised at the extreme base of the inner margin, not appendiculate: network open.

*Antennæ* shorter than the wings, curved downwards at the tip; club large, pyriform.

*Thorax* very robust, and strongly villose.

*Abdomen*, ♀, very short, robust, obtuse.

*Legs* with the spurs of the posterior tibiæ as long as the first two tarsal joints.

*Hab.* West Africa.

*Species.*

1. *C. INTRACTABILIS*, *Walker*. (*Ascal. intractabilis*, *Walk. Trans. Ent. Soc. Lond.* 2nd series, vol. v. p. 196.) Antennæ fuscae; clava nigra, subtus ad apicem testacea. Frons fusco-villosus. Thorax pallide griseo-ochraceus, fusco-flavoque-varius, cano-lanuginosus; supra maculis duabus parvis nigris. Pedes grisei; nigro-spinosi; tarsi genibusque obscurioribus. Abdomen griseum, nigro-varium, infra ad basin flavidum, striga lata, transversa, nigra, ornatum. Alæ

vitreæ; striga interrupta in dimidio apicali, punctisque nonnullis discalibus basin versus, fuscis; pterostigmate albido, intus fusconotato; venis venulisque plerumque flavis, nonnullis nigris (♀). Long. corp. 14''' ; exp. alar. antic. 47''' , postic. 43''' .

### Genus IDRICERUS, n. g.

*Wings* elongate, rather narrow, slightly dilated in the middle, apex subacute; anterior pair with a semicircular excision at the extreme base of the inner margin, followed by a small obtusely angular dilatation, and afterwards shallowly excised, not appendiculate: network moderately open.

*Antennæ* shorter than the wings, straight; club very large, broadly and shortly pyriform; a dense tuft of hairs on the face and between the antennæ.

*Thorax* very villose.

*Abdomen* shorter than the wings, moderately stout.

*Legs* with the spurs of the posterior tibiæ scarcely equalling the first two tarsal joints.

*Hab.* North India.

Allied to *Cormodes*, but differing from it in the form of the wings, especially at the basal portion of the inner margin, and in the longer and less robust abdomen.

### *Species.*

1. I. DECREPITUS, Walker. (Ascal. decrepitus, Walk. Trans. Ent. Soc. Lond. ser. 2, vol. v. p. 197.) Frons vertexque cinereo-villosa; pilis inter antennis nigris. Antennæ pallide flavæ, nigrocinctæ; articulo basali clavaque nigris. Thorax niger, antice flavo-varius, supra in medio fusco-villosus, utrinque et infra cinereo-villosus. Pedes fuscis; tibiis late flavo-bicinctis, nigro-hirsutis; tarsis nigris, articulo basali ad basin testaceo; unguiculis calcaribusque rufis. Abdomen nigrum, paullo cinereo-pilosum; segmentis duobus basalibus supra testaceo-maculatis. Alæ vitreæ; venis venulisque nigris, nonnullis nigro-marginatis, flavo-interruptis; pterostigmate brunnescente, nigro-venato. Long. corp. 12-15''' ; exp. alar. antic. 32-40''' .

I have examples from North India, taken in May and June by Capt. A. M. Lang, R.E.

Walker could not have observed the entire eyes, or he would never have indicated (*l. c.*) that the species belongs to the group of *Ogcogaster* (*tessellatus*, &c.), with which it has no affinity whatever.



2. I.(?) *OBSCURUS*, *Westwood*. (Ascal. (Haplogl.) *obscurus*, *Westw. Cab. Or. Ent.*)

I can say nothing as to this species; the type is no longer in existence, or cannot be found: I am acquainted with no Asiatic species with simple eyes, excepting *I. decrepitus*.

### Genus *MELAMBROTUS*, n. g.

*Wings* long and very narrow, the inner margin longly excised at the base, afterwards the inner and costal margins are nearly parallel; anterior pair appendiculate: network rather close; transverse branch of the lower cubitus confluent with the postcosta in all the wings.

*Antennæ* short and stout, nearly straight, only about half the length of the wings, without hairs at the base; club roundly capitate.

*Thorax* slightly villose above, densely so on the breast.

*Abdomen* about the length of the wings, subcylindrical, without appendices in the ♂.

*Legs* very short and strongly spinous; spurs of the posterior tibiæ as long as the first two tarsal joints.

*Hab.* South-west Africa.

A remarkable genus, founded on the single species described below: the wings are narrower, and the antennæ shorter, than in any other genus of *Holophthalmi*, and the facies altogether peculiar. In the posterior wings the branch of the lower cubitus is almost obsolete, scarcely distinguishable from the ordinary transverse veinlets, owing to the space between the veins being so greatly narrowed.

### *Species.*

1. *M. SIMIA*, nov. sp. Frons cinereo-pilosus. Vertex transverse fusco et flavo-varius, fusco-villosus. Antennæ flavæ; clava intus nigro tenuiter semicincta. Thorax fusco-griseus, testaceo-varius, supra sparse fusco-pilosus, infra dense cinereo-villosus; supra maculis tribus, quarum duæ punctiformes, altera transversa, semilunata, nigris, late cinereo-cinctis, vel marginatis. Pedes nigri, cinereo-pilosi, nigro-spinosis; tibiis ad basin obscure testaceis. Abdominis dimidium basale cinereum, nigro-punctatum, apicale nigrum. Alæ vitreæ, striga subcostali e basi usque ad apicem extensa, in aream poststigmaticalem dilatata, nigra, ornata; venis venulisque plerumque nigris, nonnullis albidis; pterostigmate flavido, intus nigro-notato (♂): Long. corp. 14''' ; exp. alar. antic. 32'''.

*Hab.* Damara Land (*Andersson*). In my collection.

## Genus TMESIBASIS, n. g.

*Wings* elongate, the basal portion of the inner margin very strongly excised and petiolate, longly appendiculate in the anterior pair: after the narrow base rather broadly dilated and nearly oval, acute at the apex: network rather open; branch of the lower cubitus confluent with the postcosta in all the wings.

*Antennæ* much longer than the wings, furnished with verticillate hairs at the base: club extremely long and slender.

*Thorax* scarcely villose.

*Abdomen* slender, shorter than the wings (without appendices in the ♂?).

*Legs* with the spurs as long as the first three tarsal joints.

*Hab.* Mozambique.

Founded on a single species, *Ascal. laceratus*, Hagen, which I have not seen: the characters have been drawn up from Hagen's careful description and beautiful figure. A very sharply defined genus, without a parallel among the *Holophthalmi*; the formation of the antennæ approaches that of *Colobopterus* among the *Schizophthalmi*.

*Species.*

1. T. LACERATA, Hagen. (*Ascal. laceratus*, Hag., *Peters's Reise nach Mossamb.* p. 92, pl. v. fig. 3.)

## Division II. SCHIZOPHTHALMI.

## Genus CORDULECERUS, Rambur.

(*Suphalasca*, part., Lefebv., Hag.)

*Wings* ample, usually broad, but varying much. Anterior pair with an evident excision at the extreme base of the inner margin, not appendiculate, dilated in the middle, inner margin contracted at the point where the cubiti terminate; apex acute posterior pair with the anal portion of the inner margin ordinarily deeply sinuate in the ♂, slightly sinuate in the ♀, broad at the anal portion, contracted at the termination of the cubiti, no transverse branch of the lower cubitus; postcosta strongly sinuous: network open.

*Antennæ* as long as the wings, the extreme base with a few verticillate hairs; club elongately spoon-shaped; a very dense tuft of hairs between the antennæ.

*Eyes* with the divisions equal.

*Thorax* very densely and longly villose.

*Abdomen* short; rather slender in the ♂ and without appendices; shorter and very obese in the ♀.

*Legs* with the spurs of the posterior tibiæ somewhat exceeding the first two tarsal joints.

*Hab.* Tropical and South America.

At first sight a very strongly marked genus, characterized by its ample and subtriangular wings, the anal portion of the posterior pair being profoundly sinuate in the ♂; but at least one species (I believe, the typical *Asc. surinamensis* of Fabricius) shows an affinity with *Ulula*: the tibial spurs are certainly shorter than in that genus, but not to the extent indicated by Rambur, who says "aussi longs que les deux premiers articles;" to my eyes they appear fully as long as the first *three* joints: the club of the antennæ is more elongately oval than in *Ulula*, and very concave above; the base of these members scarcely furnished with verticillate hairs.

### *Species.*

Much confusion has existed in the synonymy; and Hagen (Hemerob. Synop. Synonym.) has attempted to overcome this by grouping several names as synonyms of one species, *C. surinamensis*; but I believe that all previous writers have failed in identifying the true Fabrician species of that name, and that at least six distinct species exist in collections:—

1. *C. VULPECULA*, *Burm.* (*Ascal. vulpecula*, *Burm.*, *op. cit.* p. 1001, ♂.—*A. alopecinus*, *Burm. Handb.* ii. p. 1000, ♀.—*A. surinamensis*\*, *Guérin, Icon.* p. 387, pl. lxii. f. 3, *nec Fab.* ♀.—*C. surinamensis*, *Ramb. Névro.* p. 360, text, part.—*A. garrulus*, *Walk. Cat. Brit. Mus. Névro.* p. 441, ♂.—*A. litigiosus*, *Walk. op. cit.* p. 441, ♀.) Caput thoraxque supra densissime rufescenti-villosa, hic supra macula parva mediana fusca notatus, infra fuscescente-villosus. Antennæ rufo-fusæ; clava vel supra solum, vel omnino, ochracea. Pedes flavidi; tibiis basin versus extus indistincte fusco-semicinctis. Abdomen fusco-nigrum, supra rufo-maculatum. Alæ amplæ, inæquales, pallide

\* Baron De Selys Longchamps, in the 'Compte Rendu' of the Meeting of the Société Entomologique de Belgique, held on the 6th May, 1871, adopts "*brasiliensis*," Guérin, for this species; but I cannot admit this name, because Guérin distinctly states in his 'Iconographie' that "*brasiliensis*" was a printer's error for "*surinamensis*," and occurs on the Plate in some copies only; in the text the name is always printed "*surinamensis*."

aureo-tinctæ; venis venulisque rufescentibus vel rufo-fuscis; pterostigmate flavescente: margo analis posticarum in ♂ profunde sinuato-excisus; in ♀ leviter excisus, macula magna, irregulariter triangulari, fusca notatus (interdum parte basali omnino fusco-suffusa). Long. corp. ♂ 15''; ♀ 12''; exp. alar. antic. 37'', postic. 33''.

*Hab.* Nicaragua to Minas Geraes.

Apparently having a greater range of latitude than the allied species.

2. *C. villosus*, *Palis. de Beauv.* (*Ascal. villosus*, *P. de Beauv. Ins. Af. et Amer.* p. 86, *Névrop.* pl. vii. fig. 4.) Rufo-villosus. Antennæ fuscae, ad basin rufescentes; clava ochracea. Abdomen fuscum, supra rufo-maculatum. Pedes flavidi. Alæ amplæ, inæquales, fuliginoso-tinctæ; venis venulisque nigricantibus; pterostigmate sordide flavescente: margo analis posticarum in ♂ profunde excisus; in ♀ leviter excisus, macula subquadrata, fusca, notatus. Magnitud. *C. vulpeculæ*.

*Hab.* San Domingo (*P. de B.* in coll. *De Selys*), Demerara (coll. *M'Lach.*).

Certainly distinct from *C. vulpecula*; in the ♂ the anal margin of the posterior wings is more deeply excised and less sinuate than in that species; and the anal spot on these wings in the ♀ is smaller and more quadrate. The coloration of the wings is also different and approaches that in the ♂ of *C. Mac-lachlani*. Beauvois's type is in De Selys's collection.

3. *C. MacLACHLANI*, *De Selys.* (*Cord. surinamensis*, *Ramb. Névrop.* p. 360, text, part., pl. 9. f. 1 (*nec Fab.*)—*C. MacLachlani*\*, *Selys, Compt. Rend. Soc. Ent. Belg.* 6 Mai, 1871.) Frons vertexque densissime nigro-villosi. Antennæ nigrae; clava supra rufescente. Thorax supra in medio densissime fulvo-griseo villosus, utrinque et infra nigro-villosus. Pedes rufo-testacei. Abdomen nigrum. Alæ amplæ, inæquales; in ♂ pallide fusco-tinctæ: margo analis posticarum vix excisus; pterostigmate brunneo, nigro-venato; venis venulisque nigris: anticæ in ♀ ut in ♂; posticæ ad basin late saturateque nigro-fuscae, ad apicem fusco-suffusæ; margo analis leviter excisus. Magnitud. fere ea *C. vulpeculæ*.

*Hab.* Brazil. In De Selys's collection, olim Rambur's.

Var. Paullo minor. Alæ anticæ in ♀ ad basin saturatiores; posticæ ad basin apicemque late et intense nigro-fuscae, nitidæ.

*Hab.* Rio Ucayali (*Bartlett*). In my collection.

Rambur has evidently comprised *C. vulpecula* and *MacLachlani*,

\* I had intended another name for this species; but after the paper was read I received the monthly 'Compte Rendu' of the Société Ent. de Belgique, in which De Selys, in a note on the species of *Ascalaphi* confounded under the term *surinamensis*, proposes to call it *MacLachlani*. I have no alternative but to accept his proposition.

and probably also *villosus*, in his description (figuring only *Mac-lachlani*) of *surinamensis*.

The variety in my collection from the Ucayali differs especially in the sharply defined *apical*, as well as basal, dark portion of the posterior wings of the ♀.

4. *C. UNICUS*, *Walker*. (*Ascal. unicus*, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 195.) Frons fusco-villosus. Antennæ rufescentes, nigro-annulatæ; clava nigra. Thorax supra cinereus, utrinque nigro-fuscus. Pedes testacei. Abdomen supra rufescens, infra infuscatum. Alæ anticæ apicem versus angustatæ, hyalinæ, ad basin fusco-tinctæ; maculis duabus, quarum una apicalis, altera parva subapicalis, pterostigmate, venulisque costalibus, fuscis: posticæ elongato-triangulares, peracutæ, omnino fuscae, macula hyalina parva ad costæ apicem, excepta; margo analis obliquus, leviter excisus. Long. corp. 11''; exp. alar. antic. 32'', postic. 27''.

*Hab.* Brazil?

5. *C. SUBIRATUS*, *Walker*. (*Ascal. subiratus*, *Walk. Cat. Brit. Mus. Neurop.* p. 439.) Frons nigro-pervillosus. Antennæ rufescentes, nigro-annulatæ; clava ochracea, infra vix infuscata. Thorax supra griseo-ochraceus, utrinque niger; vitta angustata mediana nigra: infra niger. Pedes picei; femoribus pallidioribus. Abdomen nigrum. Alæ anticæ apicem versus paullo angustiores, acutæ, hyalinæ, ad basin fusco-suffusæ; pterostigmate nigro: posticæ hyalinæ, dimidio basali fere, strigisque nonnullis, fuscis; margo analis leviter exciso-sinuatus. Long. corp. 10''; exp. alar. antic. 28'', postic. 25''.

*Hab.* Guatemala, Mexico, Honduras, Brazil.

6. *C. SURINAMENSIS*, *Fab.* (*Ascal. surinamensis*, *F. Ent. Syst. Suppl.* p. 207 (*nec auct.*) Caput fulvo-villosum. Antennæ nigrae; clava ochracea. (Thorax fusco-pilosus?) Pedes picei; tarsorum articulis quatuor basalibus fusco-nigris. Abdomen nigro-fuscum, transverse fulvo-maculatum. Alæ paullo latæ, subæquales, hyalinæ; pterostigmate parvo, flavescente: ♀ margo analis posticarum paullo excisus, macula fusca subquadrata ad angulum analem signatus. Long. corp. 11''; exp. alar. antic. 33'', postic. 30''.

*Hab.* Surinam (*Fabricius*); Brazil, without indication of special locality (*De Selys's collection*).

I have seen one ♀ from De Selys's collection, from which the above diagnosis is drawn up. The colour of the villosity of the head and body is somewhat uncertain, owing to the hairs being matted together by some liquid.

There is no doubt, in my mind, that this is the true Fabrician species; it is the only one to which the description will apply,



especially as regards the words "alæ albæ." The posterior wings are much less broad than in most of the succeeding species; and in this respect it approaches the genus *Ulula*.

Genus *ULULA*, *Rambur*.

(*Sûphalasca*, part., *Lefebv.*, *Hag.*)

*Wings* ordinarily rather broad, scarcely dilated, the margins nearly parallel, a small excision at extreme base of inner margin of anterior pair, not appendiculate: network open; posterior wings without a transverse branch of the lower cubitus, and with the postcosta long and sinuous.

*Antennæ* as long as, or longer than, the wings, furnished with verticillate hairs at the base; club pyriform, rather short.

*Eyes* with the upper division rather larger than the lower.

*Thorax* slightly villose.

*Abdomen* not so long as the wings, moderately short in the ♂, obese in the ♀; without appendices.

*Legs* with the spurs of the posterior tibiæ equalling, or slightly exceeding, the first three tarsal joints.

*Hab.* North, Central, and South America.

This genus approaches the aberrant forms of *Colobopterus* on the one hand, and some forms of *Cordulecerus* on the other. From both it may be separated by the form of the hind wings. In *Cordulecerus* these are more or less excised and sinuate in the anal portion of the inner margin, the shape being somewhat subtriangular; in *Colobopterus* these wings are narrower, especially at the base; in *Ulula* they are gently rounded at this part, though varying much in breadth according to the species.

*Species.*

I have utterly failed in my attempts to separate the described species, in order to diagnose them anew. Some of them certainly vary immensely, even in the same locality, according to Mr. Bates's observations. On the other hand, I am convinced that several names have been sunk to the rank of synonyms without sufficient reason. Locality doubtless causes much modification; and this is especially noticeable in the West-Indian Islands, each of which possibly possesses what it has become the fashion to call a "Darwinian species" peculiar to it.

1. *U. HYALINA*, *Latreille*. (*Ascal. hyalinus*, *Lat. Humboldt's Recueil*, ii. p. 118, tab. xl. fig. 7; *Hag. N. Amer. Neurop.* p. 238.—*A. senex*,

*Burm. Handb.* 1001 (*teste Hagen*).—*U. senex*, *Ramb. Nérop.* p. 357?  
—*A. 4-maculatus*, *Say, Long's Exped.* ii. p. 305.)

*Hab.* Southern States; West Indies.

I have a series of examples from Texas which I consider to belong to this species. In some of them there is a grey clouding in the apex of the hind wings.

2. *U. AVUNCULUS*, *Hagen*. (*Ascal. avunculus*, *Hag. N. Amer. Neurop.* p. 238.)

*Hab.* Cuba.

According to Hagen, very closely allied to *hyalina*.

3. *U. MACLEAYANA*, *Guilding*. (*Ascal. Macleayanus*, *Guilding, Trans. Linn. Soc.* xiv. p. 140, tab. vii. fig. 11.)

*Hab.* St. Vincent (*Guilding*).

Merged in *U. hyalina* by Hagen. Typical examples are in the Oxford Museum (with larvæ); and these appear to be distinct from the Texan individuals that I consider to be *hyalina*; they are smaller, narrower-winged, and much less robust, though of the same general form. The specimens from Jamaica placed under the name by Walker are quite different, and are only forms of his *surinamensis* (*vide infra*), wanting the apical clouding of the hind wings.

4. *U. QUADRIPUNCTATA*, *Burmeister*. (*Ascal. 4-punctatus*, *Burm. Handb.* ii. p. 1001; *Hag. N. Amer. Neurop.* p. 238.—*A. 3-maculatus*, *Lefebv. Guérin's Mag.* 1842.—*A. surinamensis*, *Walk. Cat. Brit. Mus. Neurop.* p. 439 (*nec* *Fab. ??*).—*A. Macleayanus*, *Walk. op. cit.* p. 436 (*nec* *Guild. ??*).)

*Hab.* United States; Jamaica??

Walker's *surinamensis* cannot be a form of *limbata*, as stated by Hagen (*N. Amer. Neurop.* p. 239)—according to my ideas, being far too large and broad-winged an insect; but it is scarcely possible that it can be identical with Burmeister's *4-punctatus*.

5. *U. MICROCEPHALA*, *Rambur*. (*U. microcephala*, *Ramb. Nérop.* p. 359.)

*Hab.* Havana; Brazil?

I have examples indicated vaguely as from "Brazil," which seem to agree with Rambur's description, the head being certainly much smaller than in allied forms; otherwise they are very close to Rambur's type of his *senex*.

6. *U. CAJENNENSIS*, *Fabricius*. (*Ascal. cajennensis*, *Fab. Mant. Ins.* p. 250; *Ent. Syst.* ii. p. 96.)

*Hab.* Cayenne (*Fabricius*).

Rambur's *senex* may possibly be this species.

7. U. CHLOROPS, *Blanchard*. (Ascal. chlorops. *Blanch. Voy. d'Orbigny*, p. 218, tab. xxviii. fig. 8.)

*Hab.* Bolivia.

Indeterminable.

8. U. LIMBATA, *Burmeister*. (Ascal. limbatus, *Burm. Handb.* ii. p. 1001.—*Ulula limbata*, *Ramb. Nérop.* p. 358.—*A. inhonestus*, *Walk. Cat. Brit. Mus. Neurop.* p. 437 (?)—*A. sublugens*, *Walk. Tr. Ent. Soc. Lond. n. s. vol. v. p. 196* (?)

*Hab.* Central and South America.

9. U. VETULA, *Rambur*. (*Ulula vetula*, *Ramb. Nérop.* p. 358.—Ascal. subvertens, *Walk. Cat. Brit. Mus. Neurop.* p. 437.)

*Hab.* South America.

How far my appreciation of the synonymy of the last two species may be correct remains to be proved. Possibly several good species may be erroneously grouped together under the names; but they vary so much that it is impossible to form a correct opinion without extensive series from many localities.

The three species diagnosed below are very distinct, and undoubtedly new.

10. U. MEXICANA, nov. sp. Antennæ nigrae, tenuiter flavo-cinctæ; clava nigra, flavido-terminata. Frons vertexque fusco-villosi. Thorax niger, supra rufo-maculatus, infra cinereo-villosus. Pedes picei; tarsis nigro-annulatis. Abdomen nigrum, brunneo-varium. Alæ latæ, ad apicem vix acutæ, vitreæ; pterostigmate nigro-fusco; venis venulisque nigris: posticæ macula magna triangulari prope basin marginis interioris, fusca, ornata. Long. corp. 12–13''; exp. alar. antic. 25–29'', postic. 23–27''.

*Hab.* Mexico. In De Selys's collection and in the Oxford Museum.

Much resembles *Cordulecerus surinamensis*, F. An individual in the Oxford Museum, probably immature, wants the spot on the hind wings.

11. U. AMPLA, nov. sp. Antennæ flavidæ, tenuiter nigro-cinctæ; clava nigra. Frons flavus, fusco-villosus. Occiput flavum, transverse griseo-strigatum. Thorax rufo-ochraceus, supra fusco-varius, infra cinereo-villosus. Pedes flavi; tarsis nigro annulatis. Abdomen rufo-ochraceum, supra utrinque oblique nigro-strigatum, infra infuscatum. Alæ latæ, in medio dilatatae, vix acutæ, vitreæ, vel in posticis ad apicem flavido-fumosis, vel omnino fumoso-tinctæ; venis venulisque nigris; pterostigmate in anticis flavo, in posticis fuscescente. Long. corp. 13''; exp. alar. antic. 29–33'', postic. 26–30''.

*Hab.* St. Domingo. In my own collection and in Brit. Mus.

Like the last, this species approaches *Cordulecerus* in its wing-formation. I have examined about half a dozen individuals, which differ only in the presence or absence of tinting of the wings.

12. *U. AURIFERA*, nov. sp. Antennæ nigræ, ad basin flavidæ; clava subtus vix flavescente. Caput thoraxque dense aureo-griseoque villosus. Pedes flavi, griseo nigroque hirsuti; femoribus tibiisque intermediis et posticis fusciscenti-cingulatis. Abdomen flavum, supra utrinque interrupte nigro bivittatum. Alæ angustatæ; pterostigmate flavo: anticæ vitreæ; humeris flavis; venis venulisque plerumque fuscis; subcosta flava, nigro-striata, cubito inferiore, cum ramulo transverso, flavis: posticæ anticis angustiores, vitreæ, aureo-suffusæ; cubito inferiore postcostaque flavidis. Long. corp. 12''; exp. alar. antic. 28'', postic. 26''.

*Hab.* Santarem (Bates). In the British and Oxford Museums.

A pretty species, remarkable for its long and narrow wings, and the delicate golden suffusion, which shows a tendency to invade both pairs, but is most evident on the posterior.

#### Genus COLOBOPTERUS, *Rambur.*

(*Suphalasca*, part., *Lefebv.*)

*Wings* long and narrow; the extreme base of the inner margin of the anterior pair with an excision, but not appendiculate; posterior pair ordinarily with a deep excision *before* the base of the inner margin, and then a dilatation, but varying much in form: network moderately open; no oblique branch of the lower cubitus in the posterior wings, the postcosta being long and sinuous; pterostigma small.

*Antennæ* as long as, or longer than, the wings, more or less provided with verticillate hairs in the basal portion; club long and slender.

*Eyes* with the divisions equal.

*Thorax* villose, especially on the breast.

*Abdomen* rather short, slender in the ♂ and without appendices; more robust in the ♀.

*Legs* long and slender; spurs of the posterior tibiæ as long as, or longer than, the first four tarsal joints.

*Hab.* South America.

*Species.*

Varying considerably in form; distinguished from *Ulula* by the long antennæ and long and narrow wings, which are generally more or less excised at the base of the inner margin; from *Orphne* it differs in the non-appendiculate anterior wings.

1. *C. VERSICOLOR*, *Burmeister*. (Ascal. *versicolor*, *Burm. Handb.* ii. p. 1004.—*C. leptocerus*, *Ramb. Névrolog.* p. 361.—*C. nematocerus*, *Ramb. l. c.*) Antennæ flavæ, pilis verticillatis longis instructæ; apicibus articularum nigris; clava valde elongata, supra flava, infra fuscescente. Frons dense fusco-villosus. Thorax fuscus, supra maculis nonnullis lineisque transversis, infra linea utrinque, flavis ornatus. Pedes pallide flavi; genibus, tibiisque extus (anticis fere omnino) fuscis; tarsis piceo-nigris. Abdomen fuscum, flavo-varium. Alæ vitreæ; venis venulisque nigris; pterostigmate nigro (interdum pallidiores, vix flavido): anticæ in medio paullo dilatato; angulo axillari obsoleto: posticæ ante basin profunde (in ♂ profundius) excisæ, ad basin obtuse dilatatæ. Long. corp. 11–13''; exp. alar. 29–31''.

Apparently common throughout Brazil, especially in the southern districts.

2. *C. SUBRIPIENS*, *Walker*. (Ascal. *subripiens*, *Walk. Cat. Brit. Mus. Neurop.* p. 443.) Antennæ alis æquales, nigro-fuscæ, pilis verticillatis sparsis basin versus fuscis instructæ; clava perelongata, supra flava. Frons niger, flavo-marginatus, supra fulvo-hirsutus. Occiput fuscum, flavido-lineatum. Thorax niger, maculis flavis ornatus. Pedes pallide albo-flavidi; femoribus tibiisque extus fuscescentibus; tarsis fuscis. Alæ fere ut in *C. versicolori*, sed paullo latiores: anticarum margo interior basin versus longe excisus, angulo axillari prominente: posticarum parte dilatata ad basin parva. Long. corp. 12''; exp. alar. antic. 29'', postic. 26''.

*Hab.* Venezuela.

Allied to *C. versicolor*, but certainly distinct.

3. *C. DELICATULUS*, nov. sp. Antennæ alis longiores, nigræ, vix ad basin pilis verticillatis instructæ; clava nigra, supra infraque in medio flava. Frons niger, supra fusco-villosus. Occiput piceum. Thorax supra fuscus, in medio flavus, infra albidus. Pedes flavidi, fusco varii; tarsis nigris. Abdomen fuscum, supra utrinque strigis brevibus ochraceo-marginatis, ornatum. Alæ elongatæ, angustatæ, vitreæ; venis venulis pterostigmateque nigris, hoc magno: anticarum margine interiore basin versus paullo convexo, angulo axillari subacuto: posticæ anticis angustiores, subacutæ, ad apicem fumoso-nebulosæ; margine interiore basin versus leviter exciso. Long. corp. 11''; exp. alar. antic. 27'', postic. 24''.

*Hab.* Santarem (*Bates*).



4. *C. INTEGER*, nov. sp. Antennæ alis longiores, flavidæ, ad articulo-  
rum apices nigræ, basin versus pilis verticillatis paucis instructæ;  
clava fusca, obscure pallidiore annulata. Frons fuscus, fusco-villosus.  
Thorax fuscus, supra flavo-maculatus, infra cano villosus. Pedes  
fusci; femorum dimidio basali flavo; tarsis nigricantibus. Abdomen  
fuscum, supra utrinque lineis nigris, ochraceo-marginatis, signatum.  
Alæ elongatæ, subobtusæ, vitreæ; venis venulisque nigris; pterostig-  
mate nigro-fusco, nigro-venato: posticarum margine interiore ante  
basin recto, haud exciso, angulo axillari obtuso: posticarum mar-  
gine interiore basin versus leviter exciso, ad basin vix dilatato. (♀)  
Long. corp. 11''; exp. alar. antic. 29'', postic. 27''.

*Hab.* Brazil? In my collection.

Possibly the female of *delicatulus*; but this is only conjecture.

5. *C. SEPULTUS*, *Walker*. (*Ascal. sepultus*, *Walk. Cat. Brit. Mus. Neurop.* p. 445.) Antennæ alis æquales, fuscæ, ad basin pal-  
lidiore, pilis verticillatis vix instructæ; clava fusca, ad basin  
flava. Frons niger, fusco villosus. Thorax fuscus, infra sparse  
cano-villosus. Pedes pallide testacei; tibiis extus fuscescentibus;  
tarsis nigris. Abdomen testaceum, supra fusco-varium. Alæ elon-  
gatæ, subobtusæ, vitreæ; venis venulisque nigricantibus; pterostig-  
mate flavo: anticarum margine interiore ante basin leviter exciso,  
angulo axillari rotundato: posticæ anticis paullo angustiores; mar-  
gine interiore ante basin longe exciso, ad basin paullo dilatato. Long.  
corp. 11''; exp. alar. antic. 25'', postic. 22''.

*Hab.* Brazil.

6. *C. DISSIMILIS*, nov. sp. ♂. Antennæ ante medium flexuosæ, sub-  
geniculatæ, piceo-nigræ; geniculo setis spiniformibus ad articulo-  
rum apices intus instructo. Thorax minimus, supra utrinque late fusco-  
niger, infra plerumque flavidus. Pedes testacei; tibiis extus, tarsis-  
que, fuscis, illis pallido-cinctis. Abdomen fuscum, supra basin versus  
utrinque lineis nigris, rufescenti-marginatis, notatum. Alæ vitreæ,  
paullo fumoso-tinctæ; venis venulisque nigris; pterostigmate sordide  
flavo: anticarum margine postico in medio valde dilatato, ante et pone  
medium leviter exciso; angulo axillari prominente, obtuso: posticæ  
valde angustiores; margine postico in medio paullo dilatato, ante basin  
valde exciso.

♀. Antennæ fere rectæ, pilis haud instructæ. Alæ vitreæ, haud tinctæ;  
pterostigmate pallidiore, fere albido: anticæ posticæque in medio vix  
dilatatæ, ante basin marginis postici leviter excisæ. Long. corp.  
9-10''; exp. alar. ♂ 17½'', ♀ 21''.

*Hab.* Amazons (*Bates*).

This curious little species is remarkable for the dissimilarity of  
form in the sexes, as confirmed by the notes made *in situ* by Mr.  
Bates. I have seen only one ♂, which is in the Oxford Museum.

Genus ORPHNE, *Lefebvre*.

*Wings* long, very narrow at the base, afterwards somewhat dilated; anterior pair appendiculate: network rather close; transverse branch of the lower cubitus in the posterior wings not evident, the postcosta not sinuous. The posterior wings differ greatly according to sex: in the ♂ there is a very large obtuse dilatation of the inner margin before the base; in the ♀ this dilatation is absent, and these wings are much narrower.

*Antennæ* slightly longer than the wings, the base furnished with sparse verticillate hairs; club pyriform.

*Eyes* with the divisions equal.

*Thorax* moderately villose.

*Abdomen* slender in the ♂, slightly more robust in the ♀.

*Legs* slender, the spurs of the posterior tibiæ equalling the first four tarsal joints.

*Hab.* South America.

This genus has an evident and great affinity with *Colobopteris*, from which it especially differs in the appendiculate anterior wings and in the great disparity of the form of the posterior wings, according to sex. I consider it to be certainly the genus intended by Lefebvre, as it is the only one that will agree with the characters given by him ("Ailes appendiculées; antennes plus longues que les ailes"). But he was certainly in error in referring his species to *appendiculatus* of Fabricius; and this appears to have misled Hagen, who (Stett. Zeit. 1866, p. 454) makes *Orphne* equivalent to *Haploglenius*.

*Species.*

1. *O. IMPAVIDA*, Walker. (Ascal. impavidus, Walk. Cat. Brit. Mus. Neurop. p. 443, ♂.—A. intempestivus, Walk. op. cit. p. 444, ♀.)

*Hab.* Amazons.

2. *O. MACROCERCA*, Burmeister. (Ascal. macrocercus, Burm. Handb. ii. p. 1000.)

*Hab.* Bahia.

Unknown to me; possibly identical with *O. impavida*. Burmeister's examples were probably females, although he indicates that he had seen both sexes. As I have before stated, the abdomens of the females vary greatly in robustness in the same species in Ascalaphidæ.

Genus *ACMONOTUS*, n. g.

*Wings* very narrow; the extreme base of the inner margin of the anterior pair with a slight excision, followed by a rather dilated angulation, but not appendiculate: posterior wings still narrower than the anterior, especially in the basal portion; inner margin longly and shallowly excised to the base: transverse branch of the lower cubitus confluent with the postcosta in all the wings; the postcosta rudimentary, scarcely extending beyond the point of junction: network open.

*Antennæ* much shorter than the wings, straight; club suborbicular.

*Eyes* with the divisions nearly equal.

*Abdomen* longer than the wings, slender, gradually attenuated to the apex, provided with a pair of short, slightly divaricate, cylindrical terminal appendices in the ♂; first segment above elevated into an enormous conical hump, the front side of which is straight, the hinder side convex, notched at the apex.

*Legs* with the spurs nearly equalling the first two tarsal joints.

*Hab.* West Australia.

A very singular genus, founded on the species described below; the formation of the ♂ abdomen is without a parallel; but it is uncertain if the ♀ presents similar characters, though it is probable that somewhat similar peculiarities are present in that sex also.

*Species.*

1. *A. INCUSIFER*, nov. sp. Frons cinereo-villosus; clypeo labroque flavis. Vertex fusco-villosus. Antennæ flavo-albidæ, late nigro-annulatæ; clava infra nigra, supra albo-flava, tenuiter pallide annulata. Thorax niger, maculis tribus elongatis, quarum duæ longitudinales, una transversa postica, rufis, signatus. Pedes rufo-flavi; femoribus (apicibus exceptis), tibiis subtus omnino, supra semicinctis duobus, articulorum tarsorum apicibusque, nigris. Abdomen nigrum; infra macula elongata utrinque ad basin, marginibusque posterioribus segmentorum ad latera, rufescentibus; appendices dimidio basali nigro, apicali flavo, nigro tuberculato. Alæ hyalinæ; venis venulis pterostigmateque nigris; humeris flavescentibus (♂). Long. corp. 15''; exp. alar. antic. 26'', postic. 22''.

*Hab.* West Australia. In Brit. Mus.

Genus *SUPHALASCA*, *Lefebvre* (restricted).

*Wings* elongate, narrow, the costal and inner margins nearly parallel; network rather open; the transverse branch of the

lower cubitus is confluent with the postcosta in all the wings; but in the posterior wings it is scarcely distinguishable from the ordinary veinlets, and its position is only indicated by a slight geniculation of the cubitus: anterior pair with an excision at the extreme base of the inner margin; not appendiculate.

*Antennæ* much shorter than the wings, nearly straight; club nearly orbicular or truncate.

*Eyes* with the divisions nearly equal, but varying; sometimes the divisional groove is scarcely evident.

*Thorax* scarcely villose.

*Abdomen* moderate (in typical forms); appendices wanting.

*Legs* with the spurs of the posterior tibiæ about equal to the first tarsal joint (or slightly longer or shorter).

*Hab.* Australia (typical forms), Polynesia, Malayan archipelago, Africa.

This genus should be restricted to the Australian forms represented by *S. flavipes* and its allies. But I have made it a sort of "refuge for the destitute," and have placed in it several species from Africa, &c., that appear to show more affinity to the typical Australian species than to any other group, so far as can be ascertained from present knowledge, acquired ordinarily from an examination of one sex only. Under *Suphalasca*, Lefebvre included a multitude of discordant forms; and Hagen (Stett. ent. Zeit. 1866, pp. 460, 461) arranges under it (among others) all the American species of Rambur's genus *Ulula*, between which and the Old-World forms there is really no relationship; his character, "postcosta simplici," will not strictly apply to *Suphalasca*, or to any Old-World group.

[See my 'Introductory Remarks' (p. 229) for reasons which induce me to think that the genus *Stilbopteryx* (*Myrmeleonidæ*?) may be related to *Suphalasca*.]

### *Species.*

I arrange the species geographically, as follows:—

#### *Australia.*

1. *S. FLAVIPES*, Leach. (*Ascal. flavipes*, Leach, Zool. Misc. i. p. 48, pl. xx.—*Bubo flavipes*, Ramb. Nérop. p. 357.) *Antennæ* nigricantes, basi et ante clavam flavæ. *Frons* flavus, cano-villosus. *Vertex* nigro-villosus. *Thorax* flavus, supra utrinque niger, infra nigro-varius.

Pedes flavi, femoribus (ad apicem exceptis) tarsisque fusco-nigris. Abdomen nigrum, supra linea mediana, lateribus, infra marginibusque posterioribus segmentorum, flavis. Alæ subæquales; humeris, area subcostali, pterostigmateque, flavis; cellulis areæ poststigmatalis triseriatis. Long. corp. 13-14''; exp. alar. antic. 29-35'', postic. 24-29''.

Probably distributed throughout New Holland.

2. *S. IMPORTUNA*, Walker. (Ascal. importunus, Walk. Cat. Brit. Mus. Neurop. p. 427.) *S. flavipedi* valde affinis, sed paullo minor; alis angustioribus, pallide fuliginoso-tinctis.

*Hab.* Moreton Bay.

Evidently very closely allied to *S. flavipes*, but apparently distinct, in consequence of the narrow and tinted wings. I have seen two individuals precisely similar.

3. *S. SUBTRAHENS*, Walker. (Ascal. subtrahens, Walk. Cat. Brit. Mus. Neurop. p. 430.) Antennæ tenuiores, nigræ, ad basin flavæ; clava flava, infra dimidio apicali nigro. Frons pallide flavus, in medio nigricans, cano-villosus. Vertex nigro-villosus. Occiput flavum, nigro-radiatum. Thorax supra murinus, utrinque niger; infra vel pruinoso-albidus, vel utrinque linea flavida signatus. Pedes nigri; posticis ad femorum apices, intermediis femoribus omnino, anticisque (tarsis exceptis), flavis. Abdomen nigrum, supra vitta dorsali interrupta, aurantiaca, ornatum. Alæ elongatæ, subæquales; humeris flavidis; pterostigmate in anticis pallide brunneo, nigro-venato, in posticis nigro, vel nigro-fusco; area subcostali vix brunneo-tincta; cellulis areæ poststigmatalis irregulariter triseriatis; in serie inferiore magnis, cæteris parvis. Long. corp. 14''; exp. alar. antic. 32''; postic. 28''.

*Hab.* Australia. I have seen specimens from Rockhampton and from South Australia.

One example in my collection has the apical quarter of the posterior wings faintly tinged with brownish.

4. *S. WILSONI*, nov. sp. Caput, thorax, pedes alæque fere ut in *C. flavipede* (antennæ mutilatæ); venulæ transversæ costales, et infra radium, fusco-marginatæ. Abdomen nigrum, maculis dorsalibus marginibus segmentorum (supra interruptis), infraque ad basin et ad apicem, flavo-ornatum; apex pilis brevibus nigris utrinque vestitus. Long. corp. 14''; exp. alar. antic. 32'', postic. 27''.

*Hab.* South Australia (*C. A. Wilson*). In my collection.

The wings are rather narrower than in *flavipes*, and the fuscous margining or clouding of the costal and radial nervules gives them a different appearance. The dorsal margin of each abdominal segment appears to have a tendency to expand.



5. *S. DIETRICHIAE*, Brauer. (*Bubo Dietrichiae*, Brauer, *Verh. k.-k. zool.-bot. Gesells. in Wien*, 1869, p. 15.) Antennæ nigræ, ad basin flavæ. Frons pallide flavus, cano-villosus. Vertex niger, nigro-villosus. Occiput flavum, macula crescentiformi nigra ornatum. Thorax supra niger, flavo-maculatus, infra utrinque pruinoso-albidus. Pedes flavi, tarsi ad apices articulorum nigris. Abdomen fusco-nigrum, vitta dorsali, punctis lateralibus, lineaque utrinque infra ad basin, flavis, vel aurantiacis, ornatum. Alæ subæquales, sed posticæ anticis angustiores et breviores; humeris flavis; pterostigmate magno, flavo-albido; area poststigmatica pallide brunnea, cellulis triseriatis. Long. corp. 12''; exp. alar. antic. 30'', postic. 27''.

*Hab.* Rockhampton.

Readily distinguishable from the other Australian species by the brown clouding of the apex of the wings; in the anterior wings this clouding is confined to the poststigmatical costal space, but in the posterior it invades almost the entire apex. The anterior wings are comparatively shorter and broader than in the allied species. I have an individual from the same locality as Brauer's.

6. *S. INCONSPICUA*, nov. sp. (Antennæ mutilatæ.) Frons niger, griseo-villosus. Clypeus labrumque flavi. Vertex niger, nigro-villosus. Occiput nigrum, in medio flavum. Thorax fuscescens, griseo-villosus, supra et infra indistincte piceo-notatus. Pedes nigri, nittentes; femoribus (ad apicem exceptis) rufo-flavis. Abdomen nigrum, nitidum, maculis lanceolatis dorsalibus, in medio, utrinque ad basin, marginibusque posterioribus segmentorum, supra, infra et utrinque interruptis, aurantiacis. Alæ elongatæ, posticæ anticis valde angustiores; humeris flavis; pterostigmate parvo, intense nigro. Long. corp. 12''; exp. alar. antic. 26'', postic. 24''.

*Hab.* Victoria (Edwards). In my collection.

7. *S. SABULOSA*, Walker. (*Ascal. sabulosus*, Walk. *Cat. Brit. Mus. Neurop.* p. 427.) Antennæ nigræ, ad basin flavæ; clava flava, infra dimidio apicali nigricante, tenuiter flavo-cingulato. Frons flavus, in medio niger, densissime griseo-villosus. Thorax niger, griseo-villosus. Pedes nigri; genibus, articuloque ultimo tarsorum, flavis. Abdomen nigrum utrinque alternatim griseo-nigroque hirsutum; supra marginibus posterioribus segmentorum anguste rufo-aurantiacis. Alæ subæquales; humeris flavo-ochraceis; area subcostali infuscata; venis, venulis, pterostigmateque nigris; cellulis areæ poststigmaticæ biseriatis. Long. corp. 12''; exp. alar. antic. 30'', postic. 26½''.

*Hab.* Australia.

8. *S. MAGNA*, nov. sp. *S. sabulosæ* paullo affinis, sed valde major. Abdomen fere glabrum, nigro-fuscum, supra maculis magnis ova-

libus flavidis, ornatum. Vena costali pallide flava: pterostigma angustatum, infuscatum, nigro-venatum; cellulis areæ poststigmatalis triseriatis. Cæteris ut in *S. sabulosa*. Long. corp. 20''; exp. alar. antic. 40'', postic. 36''.

*Hab.* Champion Bay (*Du Boulay*). In my collection and in Brit. Mus.

The largest of the Australian species: the groove marking the divisions of the eyes is only slightly indicated, in fact, is less evident than in any other member of the group *Schizopthalmi* with which I am acquainted.

9. *S. DIFFORMIS*, n. sp. Antennæ nigræ; dimidio inferiore clavæ flavo. Frons niger, griseo-villosus. Clypeus, labrum, marginesque oculorum flavi. Vertex niger, nigro-villosus. Thorax latus, niger, subtus griseo-villosus. Pedes nigri, tibiis extus flavis. Abdomen nigrum, gradatim attenuatum, infra ad basin flavo-notatum, marginibus posterioribus segmentorum, supra interruptis, apicem versus obsolete, 2° infra late, flavo-marginatum. Alæ valde inæquales; posticæ conspicue breviores, prope basin latiores, ad apicem subangulatæ; humeris sordide flavis; pterostigmate brunneo, nigro-venato; cellulis areæ poststigmatalis paucis, magnis, biseriatis. Long. corp. 13''; exp. alar. antic. 26'', postic. 20''.

*Hab.* South Australia (*C. A. Wilson*). In my collection.

A peculiarly formed species, the great inequality in the size of the wings and the shape of the body giving it a facies different from the allied forms of the same local group. I believe my example to be a male.

The distribution of the colours of the legs is a good *prima facie* character whereby to separate the Australian species.

#### *Malayan Archipelago.*

10. *S. (?) MALAYANA*, nov. sp. Antennæ piceæ, vel piceo-nigræ, ad basin pallidiores; clava rufo-picea, ad basin nigra. Frons intense nigro-villosus. Thorax supra griseus, utrinque et antice niger; infra fuscescens, cano pilosus, utrinque late sed indistincte flavo-bistrigatus. Pedes flavidus; tibiis piceis; tarsis nigris. Abdomen tenue, supra brunneum, infra basin versus albo-pruinatum. Alæ vitreæ, antice posticis valde longiores: sat latæ, paullo in medio dilatatæ; venis venulisque nigris; pterostigmate flavido, nigro-venato; areæ poststigmatalis cellulis biseriatis, paucis, magnis. Long. corp. 18''(?); exp. alar. antic. 31-34'', postic. 26-28''.

*Hab.* Celebes (*Wallace*). In the British Museum.

The extreme apex of the abdomen is broken off in the two specimens I have examined; both appear to be males. In the

disparity of the size of the wings the species approaches *S. difformis*. The position of the insect is yet doubtful.

*New Caledonia.*

11. *S.*(?) *CALEDON*, nov. sp. (Antennæ mutilatæ). Frons fuscus, griseo-villosus, inter antennis nigro-villosus; clypeo, labro, marginibusque oculorum, flavo-ochraceis. Vertex griseo-villosus. Thorax abdomenque supra fuscus, infra griseo-pruinosis. Pedes nigri; femoribus piceis. Alæ sat latæ, subæquales, sed posticæ anticis breviores; humeris flavo-fuscis; pterostigmate fusco-nigro; cellulis areæ poststigmatalis triseriatis. Long. corp. 13''; exp. alar. antic. 34'', postic. 30''.

*Hab.* New Caledonia. In my collection and in that of Baron de Selys Longchamps.

*Africa.*

12. *S.*(?) *CEPHALOTES*, nov. sp. Caput, cum oculis, permagnum. Antennæ nigrae, articulo basali ochraceo. Frons fuscus, clypeo, labro, lateribusque flavis. Vertex nigro-villosus. Thorax supra griseo-fuscus, infra utrinque ochraceus, cano-villosus. Pedes nigri; femoribus vix nigro-piceis. Abdomen breve, nigrum, infra utrinque aurantiaco-maculatum. Alæ sat latiores, vix dilatatae; pterostigmate intense nigro: posticæ anticis valde breviores; area costali ad basin paullo gradatim dilatata. Long. corp. 11''; exp. alar. antic. 33'', postic. 25''.

*Hab.* Madagascar. In my collection.

Seems to be more allied to *S. Caledon* than to the other African species.

13. *S.*(?) *ABDOMINALIS*, nov. sp. Antennæ piceæ; clava nigra, flavido-annulata. Frons flavidus, nigro-villosus. Vertex nigro-villosus. Occiput sordide flavidum. Thorax supra saturate griseo-ochraceus, antice et in medio nigro-notatus, fusco-villosus, infra pallidior. Pedes nigri; femoribus flavis, ad apicem nigris, prope basin fusco-cingulatis. Abdomen attenuatum, subcylindricum, perelongatum (alis valde longius), nigrum, basin versus sordide ochraceum, fusco-varium, spinis brevibus utrinque dense instructum. Alæ elongatae, angustatae, haud dilatatae; pterostigmate nigro-fusco, nigro-venato; area poststigmatali infuscata. Long. corp. 20''; exp. alar. antic. 32'', postic. 26''.

*Hab.* Gaboon. One ♂ in my collection.

A second example in the Oxford Museum, perhaps a ♀, differs in the wings being much clouded all over with smoky brown. The underside of the thorax and base of the abdomen is of a pale salmon-colour.

14. S.(?) *AFRICANA*, nov. sp. (*Bubo festivus*, *Ramb. Nérop.* p. 356, part.) Antennæ nigræ; clava lurida. Frons flavidus, cinereo-villosus. Vertex fusco-villosus. Occiput piceum, in medio nigrum. Thorax supra griseo-fuscus, utrinque niger, griseo-villosus; lineis indistinctis pallidis: infra pallidior, cano-villosus, linea utrinque flava. Pedes pallide flavid; tibiis ad basin apicemque et in medio fusco-semicinctis; tarsis nigro-annulatis. Abdomen attenuatum, infuscatum, supra ad basin rubidum, infra ad basin utrinque vitta flava notatum; apice nigro-hirsuto. Alæ vitreæ; pterostigmate pallide brunneo; venis venulisque fuscis. Long. corp. 14''; exp. alar. antic. 27'', postic. 23''.

*Hab.* Gaboon, Madagascar.

The individual from the Gaboon is in my collection. I cannot separate it specifically from the old specimen, said to be from Madagascar, that is one of Rambur's types of *festivus*. My individual is certainly a ♂, and hence cannot be an *Encyoposis*. It is possible there may exist another African genus, and that in it should be placed *Suphalasca africana*, *Encyoposis rufopictus*, *E. longistigma*, and *E. festivus*.

#### Genus BUBO, *Rambur*.

*Wings* elongate, narrow, scarcely dilated; the extreme base of the inner margin of the anterior wings with a semicircular excision, the axillary angle being somewhat produced: transverse branch of the lower cubitus confluent with the postcosta in all the wings.

*Antennæ* much shorter than the wings, straight; club broadly pyriform, almost truncate.

*Eyes* with the lower division one-half smaller than the upper.

*Thorax* villose.

*Abdomen* short: appendices of the ♂ long, twisted, geniculate, with a process in the middle.

*Legs* with the spurs of the posterior tibiæ as long as the first two tarsal joints.

*Hab.* Spain, Syria, Egypt, &c.

#### *Species.*

1. *B. AGRIOIDES*, *Rambur*. (*Ascal. agrioides*, *Ramb. In. Andalus.* pl. ix. fig. 2.—*Bubo agrioides*, *Ramb. Nérop.* p. 353.)

*Hab.* Spain.

2. *B. HAMATUS*, *Klug*. (*Ascal. hamatus*, *Klug, Symb. Phys.* iii. tab. xxxvii. fig. 10.—*Bubo hamatus*, *Ramb. Nérop.* p. 354.—*A. forcipatus*, *Eversm. Bull. Mosc.* xxiii. p. 280, tab. v. fig. 4.)

*Hab.* Egypt, Syria, South Caucasus, Persia.

Genus THELEPROCTOPHYLLA \*, *Lefebvre*.

*Wings* rather narrow, slightly dilated in the middle, not appendiculate; the posterior pair much smaller than the anterior: network open: transverse branch of the lower cubitus confluent with the postcosta.

*Antennæ* one-fourth shorter than the wings, without verticillate hairs in the basal portion; club short and subtriangular: a very dense tuft of hairs between the basal joints and on the face.

*Eyes* with the lower division one-half smaller than the upper.

*Thorax* slightly villose.

*Abdomen* short, in the ♂ furnished with two long, hairy, forcipate, superior appendices, provided internally with a tooth in the middle; and two short and stout, hairy, inferior appendices: in the ♀ with a pair of very large, curved, and foliaceous (deciduous?), membranous, superior appendices, and two very short, hairy, inferior appendices.

*Legs* with the spurs of the posterior tibiæ about the length of the first tarsal joint.

*Hab.* Coast of the Mediterranean.

The single and familiar species of this genus bears, in the formation of the eyes and abdominal appendices, and in the shortness of the tibial spurs, characters so trenchant as to preclude the possibility of error.

*Species.*

1. T. BARBARA, L. (*Myrmeleon barbarum*, L. *Syst. Nat.* ii. p. 914. —*Ascal, barbarus*, Fab. *Syst. Ent.* ii. p. 313. —*A. australis*, Fab. *Mant. Ins.* i. p. 250. —*Th. australis*, Ramb. *Névrop.* p. 351; *Costa, Faun. Nap.* p. 10, tab. vii. fig. 8. —*A. variegatus*, Klug, *Symb. Phys.* iii. tab. xxxvi. fig. 11, var.)

Genus SIPHLOCERUS, n. g.

*Wings* elongate, narrow, scarcely dilated, the extreme base of the inner margin of the anterior pair with a slight excision, not appendiculate: network rather close; transverse branch of lower cubitus confluent with the postcosta in all the wings.

\* Lefebvre writes "*Deleproctophylla*," and professes to derive the first part of the name from "δῆλια (*femelle*)," an incomprehensible misreading of θῆλια. Rambur very properly corrected this error.



*Antennæ* much shorter than the wings; those the ♂ much twisted in the apical half, and subserrate internally in that portion; those of the ♀ nearly straight, and not serrate: club shortly capitate.

*Eyes* with the lower division much smaller than the upper.

*Thorax* scarcely villose.

*Abdomen* moderate: in the ♂ with a pair of short, cylindrical, forcipate appendices, which are strongly spiny within.

*Legs* with the spurs of the posterior tibiæ about equal to the first two tarsal joints.

*Hab.* North India.

Allied to *Bubo*; differing in the form of the ♂ antennæ and of the anal appendices.

### *Species.*

1. *S. NIMIUS*, Walker. (Ascal. nimius, *Walk. Cat. Brit. Mus. Neurop.* p. 429, ♂.—*A. luctifer*, *Walk. op. cit.* p. 432, ♀.

### Genus *HELICOMITUS*, n. g.

*Wings* as in *Bubo*, but with the axillary angle of anterior pair scarcely evident.

*Antennæ* shorter than the wings; in the ♂ irregularly sinuous in the basal half; small tufts of hairs on the outer side of the basal portion; club shortly capitate.

*Eyes* with the lower division one-half smaller than the upper.

*Thorax* scarcely villose.

*Abdomen* slender, rather long, and without appendices in the ♂; somewhat short in the ♀.

*Legs* with the spurs of the posterior tibiæ as long as the first tarsal joint.

*Hab.* North India, China.

Allied to *Bubo* and *Siphlocerus*; differs from the latter in having no abdominal appendices, and in the form of the ♂ antennæ.

### *Species.*

1. *H. INSIMULANS*, Walker. (Ascal. insimulans, *Walk. Cat. Brit. Mus. Neurop.* p. 429, ♂.)

Walker makes no mention of the singular conformation of the antennæ of his type: possibly he considered these organs unnaturally deformed.

2. *H. IMMOTUS*, Walker. (Ascal. immotus, *Cat. Brit. Mus. Neurop.* p. 425.—*A. odiosus*, *Walk. op. cit.* 426.)

3. *H. DICAX*, Walker. (Ascal. dicax, *Walk. Cat. Brit. Mus. Neurop.* p. 423, ♀.—*A. sinister*, *Walk. op. cit.* p. 424, ♀.—*A. procax*, *Walk. op. cit.* p. 425, ♀.)

Walker's so-called species seem to depend upon differences in degrees of maturity.

4. *H. VERBOSUS*, Walker. (Ascal. verbosus, *Walk. Cat. Brit. Mus. Neurop.* p. 426, ♀.)

5. *H. PROFANUS*, Walker. (Ascal. profanus, *Walk. Cat. Brit. Mus. Neurop.* p. 428, ♀.)

This is only a preliminary view of the species of this genus. It is possible that the first three may be only conditions of one.

#### Genus ENCYOPOPOSIS, n. g.

*Wings* elongate, obtuse, little dilated, moderately broad; the inferior pair nearly similar in shape, but shorter and narrower; anterior pair with a semicircular excision at the extreme base of the inner margin, not appendiculate: network open; transverse branch of lower cubitus confluent with the postcosta in all the wings.

*Antennæ* shorter than the wings; club broad; without verticillate hairs at the base.

*Eyes* very large; the upper division more than twice the size of the lower.

*Thorax* slightly villose.

*Abdomen* (♂) constricted at the base, afterwards very obese, gradually diminishing to the apex; furnished with a pair of long, stout, cylindrical appendices directed downwards, approximated at the base and apex, the latter knobbed and obtuse, directed upwards. (Short and obese in the ♀.)

*Legs* with the spurs of the posterior tibiæ scarcely so long as the first tarsal joint.

*Hab.* Africa.

Allied to *Bubo*, but remarkable for the strongly inflated abdomen of the ♂, and differing in the form of the appendices.

#### *Species.*

1. *E. FLAVILINEA*, Walker. (Acal. flavilinea, *Walk. Trans. Ent. Soc. Lond.* ser. 2. vol. v. p. 197.) *Antennæ* nigræ, ad basin flavæ. *Frons*

flavo-albidus, cinereo-villosus. Vertex fusco-villosus. Occiput flavo-albidum, supra in medio flavum. Thorax flavus, supra vittis tribus, infra strigis tribus obliquis, nigris, ornatus. Pedes flavi; tarsis nigris. Abdomen supra aurantiacum, vitta utrinque dentata, marginibusque segmentorum, nigris, maculis geminatis flavis; infra ad basin flavum; vitta mediana lanceolata nigra; ♂ appendicibus flavis, spinis brevibus nigris vestitis. Alæ vitreæ; humeris radioque flavis; venarum venularumque cæteris, pterostigmateque, nigris. Long. corp. ♂ cum append. 15''', ♀ 14'''; exp. alar. antic. ♂ 31''', ♀ 38'''; postic. ♂ 26''', ♀ 34'''.

*Hab.* Cape of Good Hope. The ♂ in my collection, the ♀ in that of the British Museum.

2. *E. AMICUS*, nov. sp. Antennæ nigræ, ad basin piceæ. Frons flavus, flavo-villosus. Vertex fusco-villosus. Thorax flavus, supra vittis duabus nigris ornatus; infra flavidum, utrinque fuscescens. Pedes omnino flavi. Abdomen ad basin flavum, utrinque vitta nigra dentata ornatum. Alæ vitreæ; humeris, pterostigmate, subcosta, radio, cubitisque ad basin, flavis, venarum venularumque cæteris nigricantibus. Long. corp. ? (abdomen mutilatum); exp. alar. antic. 34''', postic. 29'''.

*Hab.* Natal. In De Selys's collection.

Closely allied to *flavilinea*. The single individual appears to be a ♀; but the abdomen wants all but the basal segments.

3. *E. (?) RUFO-PICTUS*, Walker. (Ascal. rufo-pictus, *Walk. Cat. Brit. Mus. Neurop.* p. 423.) Antennæ paullo flexuosæ, rufæ; clava nigra. Vertex occiputque rufi. Thorax obscure rufescens, infra griseo-villosus. Pedes rufi; tibiis ad basin, tarsisque nigris. Abdomen rufo-griseum, supra maculis utrinque nigris. Alæ fere vitreæ, vix flavido-tinctæ; pterostigmate magno, rufo; venis venulisque flavidis (♀). Long. corp. 15'''; exp. alar. antic. 38''', postic. 34'''.

*Hab.* Sierra Leone (*Morgan*).

I think this species belongs to the genus, though certainty is not obtainable without seeing the ♂.

4. *E. (?) LONGISTIGMA*, nov. sp. Antennæ nigræ vel piceo-nigræ. Frons rufo-ochraceus, aureo-villosus. Thorax sordide ochraceus, fusco-signatus. Pedes nigri; genibus testaceis (♀). Abdomen breve, obesum, fuscum; vitta dorsali ventralique rufo-ochracea, nigro-interrupta. Alæ pallide fulvo-tinctæ; cellulis plurimis saturatiore fulvo pupillatis; pterostigmate perelongato, piceo-nigro; area postigmaticali cellulis paucis, magnis, instructa; anticæ in medio paullo dilatato, basin versus gradatim angustiores; posticæ fere dimidio angustiores, subacutæ (♀). Long. corp. 10'''; exp. alar. antic. 31''', postic. 26'''.

*Hab.* White Nile. In my collection.

A decidedly aberrant species; yet, from an examination of the ♀ only, it cannot be located in any other group.

5. E. (?) *FESTIVUS*, Rambur. (*Bubo festivus*, Ramb. *Nérop.* p. 356, part.) Antennæ rufescentes vix obscure annulatæ, ad basin flavidæ; clava nigra. Frons occiputque flavi, ille cano-pilosus. Thorax supra niger, vittis tribus, quarum una mediana unaque utrinque, flavis, ornatæ. Pedes omnino flavi. Abdomen flavum, utrinque nigro-maculatum fere vittatum, infra vitta mediana nigra signatum. Alæ vitreæ; subcosta radioque flavidis, venarum venularumque cæteris nigricantibus; pterostigmate brunnescente, nigro-venato. Long. corp. 10-12''; exp. alar. antic. 29-30'', postic. 24-25''.

*Hab.* Senegal.

This diagnosis has been made from Rambur's Senegal types. Rambur considered he had both sexes. The two Senegal types present very great differences in the form of the abdomen, one having that part small and shrunken, the other very obese. If they be really ♂ and ♀, then the insect cannot be an *Encyopsis*; for the smaller one (♂?) has no appendices. The type from Madagascar is a different species, which I cannot separate from my *Suphalasca* (?) *africana* (vide antè, p. 259).

#### GENUS *OGCOGASTER*, Westwood.

*Wings* broad, dilated in the middle; the extreme base of the inner margin of the anterior pair with an excision, not appendiculate: network open; branch of the lower cubitus confluent with the postcosta in all the wings.

*Antennæ* much shorter than the wings, straight, without hairs at the base; club broadly capitate.

*Eyes* very large; the upper division much larger than the lower.

*Thorax* slightly villose.

*Abdomen* shorter than the wings, subcylindrical in the ♂, appendices long and cylindrical, directed downwards and forcipate: strangled at the base, and afterwards very obese in the ♀; with bright and varied markings.

*Legs* with the spurs of the posterior tibiæ equalling the first tarsal joint.

*Hab.* India.

The ♂ appears to be scarce: I have only seen that of *O. segmentator*. The ♀ abdomen, although so conspicuously large when gravid, shrinks to a size equal to that of the ♂ when the ova are deposited.

*Species.*

The two species are sufficiently recognizable from Westwood's description and figures.

1. *O. TESSELLATA*, *Westwood*. (Ascal. (Ogcog.) tessellatus, *West. Cab. Oriental Ent.* pl. xxxiv. 1.)

*Hab.* India.

2. *O. SEGMENTATOR*, *Westwood*. (Ascal. (Ogcog.) segmentator, *West. op. cit.* pl. xxxiv. fig. 2.)

*Hab.* India.

GENUS *ACHERON*, *Lefebvre*.

(*Hybris*, part., *Hag.*)

*Wings* elongate, dilated in the middle, especially in the ♀; the extreme base of the inner margin of the anterior pair with an oblique excision, followed by a slight dilatation, but not appendiculate: network rather dense; branch of the lower cubitus confluent with the postcosta in all the wings. Pterostigma large, the apical side extended and very oblique.

*Antennæ* shorter than the anterior wings, with a slight bend in the basal portion in the ♂, and the apex bent downwards; *denticulate internally at the base*; club broadly pyriform.

*Eyes* with the upper division rather larger than the lower.

*Thorax* scarcely villose.

*Abdomen* very long in the ♂, much longer than the wings; shorter in the ♀, slender and laterally compressed in both sexes; appendices absent.

*Legs* with the spurs of the posterior tibiæ scarcely longer than the first tarsal joint.

*Hab.* North India and China.

The ♂ is readily distinguished by the great length of the abdomen, absence of appendices, and the denticulate base of the antennæ; the ♀ is much allied to that of *Hybris*, and is not readily separable therefrom; the broader wings, and longly extended pterostigma of the anterior pair, and the somewhat dilated base of the costal area in the posterior pair, are the most evident characters.

*Species.*

1. *A. LONGUS*, *Walker*. (Ascal. longus, *Walk. Cat. Brit. Mus. Neurop.* p. 435, ♂.—*A. trux*, *Walk. op. cit.* p. 432, ♂.—*A. loquax*, *Walk. op. cit.* p. 434, ♀.—*A. anticus*, *Walk. l. c.* ♀.)

Walker's several species appear to me to be all forms or sexes



of one, for which I adopt the name *longus*. The ♂ varies in having the wings either vitreous, or uniformly tinted with pale brown, according to maturity; *trux* is a very immature ♂, with the abdomen mutilated; hence the discrepancy in the length of body. *Loquax* is the ordinary fully mature form of the ♀, the fore wings being strongly margined with brown on the costa, and the hind wings almost uniformly deep golden yellow; *anticus* is less mature, with the wings vitreous and the pterostigma pale. The locality, "Brazil," given for *loquax* by Walker, is a misprint for "Bengal."

### Genus HYBRIS, *Lefebvre*.

(*Bubo*, part., *Ramb.*, *Hag.*; *Ogcogaster*, part., *West.*)

*Wings* elongate, considerably dilated in the middle; the extreme base of the inner margin of the anterior wings with an excision, followed by a rather prominent axillary angle, not appendiculate: network rather close; pterostigma large; transverse branch of the lower cubitus confluent with the postcosta in all the wings.

*Antennæ* as long as the wings; in the ♂ the basal portion is bowed outwardly, afterwards nearly straight, without teeth or hairs; in the ♀ straight: club shortly and broadly pyriform, almost truncate.

*Eyes* with the upper division rather larger than the lower.

*Thorax* slightly villose.

*Abdomen* rather shorter than the anterior wings, laterally compressed in both sexes: in the ♂ furnished with appendices, which are usually rather long, cylindrical, and forcipate, or shorter and somewhat spoon-shaped.

*Legs* with the spurs of the posterior tibiæ about the length of the first tarsal joint.

*Hab.* India China, Japan, and the Malay archipelago.

Closely allied to *Acheron*, and also to *Glyptobasis*, notwithstanding the appendiculate wings of the latter genus.

### *Species.*

I am not prepared to give any definite information as to the number of species. All the forms that I have seen present a remarkable similarity in general appearance; yet that there are several species is absolutely certain from the structure of the ♂ appendices, which in *H. angulata* are remarkably dissimilar.

The wings vary much in tinting in different individuals, and certainly independently of species. At present I can separate only three specific forms, as under:—

1. *H. JAVANA*, *Burmeister*. (*Ascal. javanus*, *Burm. Handb.* ii. p. 1001.)  
Pedes nigri. Appendices maris breviores, cylindricæ, forcipatæ, ad apicem vix incrassatæ, nigræ, ad basin piceæ, pilis spiniformibus nigris vestitæ.

*Hab.* Malay archipelago.

2. *H. SUBJACENS*, *Walker*. (*Ascal. subjacens*, *Walk. Cat. Brit. Mus. Neurop.* p. 431 (♀).—*A. remotus*, *Walk. op. cit.* p. 447 (♀).—*Bubo javanus*, *Ramb. Névropt.* p. 355, nec *Burm.*?) Major. Pedes rufescentes. Appendices maris longiores, cylindricæ, robustæ, forcipatæ, rufescentes, pilis spiniformibus nigris vestitæ.

*Hab.* China; Japan; Formosa.

Larger than *javana* and separable especially by its reddish legs and the much longer and stronger appendices of the ♂.

*Remota* is placed in the *Holophthalmi* by Walker; but the type is a much damaged individual (absolutely specifically identical with that of *subjacens*), in which the eyes are mutilated through one division having been removed!

Rambur gives no locality for his *javanus*. Judging from the colour of the legs and appendices, I consider that his species is probably *subjacens*. I have seen individuals of the genus *Hybris* from various islands of the Malay archipelago that I consider to be the true *javana*, and all have black legs and appendices.

3. *H. ANGULATA*, *Westwood*. (*Ascal.* (*Ogcog.*?) *angulatus*, *Westwood, Cab. Or. Ent.*—*Ascal. accusans*, *Walk. Cat. Brit. Mus. Neurop.* p. 431.) Magnitud. *H. subjacentis*. Alæ latiores. Pedes piceo-nigri. Appendices maris breves, haud forcipatæ, intus concavæ, rufæ, ad apicem spinis brevibus nigris dense instructæ.

*Hab.* Assam; Silhet.

A broader-winged insect with very differently formed appendices. The colour of the dorsum of the abdomen is of a much brighter red than in the allied species.

4. *H. (?) CERVINA*, *Hagen*. (*Ascal. cervinus*, *Hag. Verh. zool.-bot. Gesell. in Wien*, 1858, p. 481.)

*Hab.* Ceylon.

Unknown to me. It might be a *Glyptobasis*, only that Hagen in describing the wings says, "margine anteriorum basali anguloso," which will scarcely apply to the appendiculate wings of that genus.

## Genus GLYPTOBASIS, n. g.

(Ogcogaster, part., *Westwd.*, *Hag.*)

*Wings* elongate, much dilated in the middle, narrow at the base; network rather close; branch of the lower cubitus confluent with the postcosta in all the wings: anterior pair appendiculate.

*Antennæ* rather shorter than the wings; in the ♂ slightly bent at the base, and in that portion each joint is furnished with a small sharp tooth or spine; club in the form of a short truncate cone.

*Eyes* with the upper division rather larger than the lower.

*Thorax* slightly villose.

*Abdomen* rather shorter than the wings, marked with bright colours; that of the ♂ slender, with a pair of claw-shaped corneous appendices; more robust in the ♀.

*Legs* with the spurs of the posterior tibiæ nearly equalling the first two tarsal joints.

*Hab.* India.

*Species.*

I am unable to diagnose the forms in an intelligible manner. It is evident that several species exist, presenting special characters in the appendices of the ♂, independently of general peculiarities. As in several other genera, the males seem to be much rarer than the females, or their habits cause them to be less frequently captured; hence much difficulty arises. The following separation of described species will probably be found tolerably correct. The wings, as in *Acheron* and *Hybris*, certainly acquire an amount of tinting varying according to the maturity of the individual.

1. *G. DENTIFERA*, *Westwood*. (Ascal. (Ogcog.) *dentifer*, *West. Cab. Or. Ent.*)

I possess several examples from Bombay that are certainly referable to this species.

2. *G. INCUSANS*, *Walker*. (Ascal. *incusans*, *Walk. Cat. Brit. Mus. Neurop.* p. 442, ♂.—*A. nugax*, *Walk. op. cit.* p. 433, ♀?)

*Hab.* Ceylon.

*G. incusans* is certainly distinct from *dentifera*. That *nugax* may be the female of it is probable from the similarity of locality.

## Genus NEPHONEURA, n. g.

(Proctarrelabris, part. *Lefebv.*?)

*Wings* elongate and rather broad; anterior pair narrow at the base and appendiculate; posterior pair longly and shallowly excised on the inner margin: network moderately dense; branch of the lower cubitus in the posterior wings confluent with the postcosta.

*Antennæ* considerably shorter than the anterior wings, strong, straight, the base furnished with verticillate hairs; club shortly and broadly pyriform, almost truncate; a dense tuft of hairs on the face and between the antennæ.

*Eyes* with the divisions nearly equal.

*Thorax* robust, slightly villose above and densely so on the breast.

*Abdomen* shorter than the wings; in the ♂ furnished with long, forcipate, terminal, simple appendices.

*Legs* with the spurs of the posterior tibiæ scarcely exceeding the first tarsal joint.

*Hab.* South Africa.

*Species.*

1. *N. CAPENSIS*, *Fab.* (*Ascal. capensis*, *F. Spec. Ins.* i. p. 400; *Ent. Syst.* ii. p. 96.) Frons vertexque dense cinereo-brunneoque pilosi. Antennæ rufæ, pallido annulatæ; clava nigra. Thorax fusco-testaceoque varius; infra linea utrinque albida. Pedes rufo-picei; tibiis ad basim apicemque, et in medio, flavo-semicinctis. Abdomen fuscum; marginibus posticis segmentorum, supraque maculis obliquis, nigris. Appendicibus ♂ rufescentibus, intus breviter nigro-spinosis. Alæ hyalinæ, longitudinaliter brunneo-strigatæ; maculis in area subcostali, marginibusque venularum costalium, rosaceis; venis principalibus rufescentibus, venulis nigris, plerumque brunneo-nebulosis vel marginatis; pterostigmate rufescente. Long. corp. 13''; exp. alar. antic. 32'', postic. 27''.

*Hab.* Cape of Good Hope. In my collection and in Brit. Mus.

This is certainly the true Fabrician *capensis*, according to the type in the Banksian Collection now in the British Museum. Fabricius does not mention the appendiculate wings, and his description fails to indicate the rosy markings; but the description was drawn up from an unexpanded example.

2. *N. COLLUSOR*, nov. sp. *N. capensi* affinis, differt alis haud strigatis, venulis (costalibus exceptis) haud marginatis; maculis subcostalibus plus infuscatis; tibiis extus dimidio basali flavido, vix interrupto:

alæ posticæ ♀ nebula magna paullo ante apicem fusco-testacea, ornatae.

*Hab.* Cape of Good Hope. In my collection and in Brit. Mus.

Genus PROCTARRELABRIS, *Lefebvre* (restricted).

(*Bubo*, part., *Rambur*, *Hag.*)

*Wings* rather broad; anterior pair with a small concave excision at the extreme base of the inner margin, followed by a slight dilatation, but not appendiculate: network open; branch of the lower cubitus in the posterior wing confluent with the postcosta.

*Antennæ* rather shorter than the anterior wings, strong, nearly straight, the base furnished with verticillate hairs; club short and capitate; a dense tuft of hairs on the face and between the antennæ.

*Eyes* with the divisions equal.

*Thorax* robust, densely villose, especially on the breast.

*Abdomen* slender in the ♂, and furnished with long and slender, forcipate, simple, terminal appendices; shorter and very obese in the ♀.

*Legs* with the posterior tibiæ nearly equalling the first two tarsal joints.

*Hab.* South Africa.

### *Species.*

1. *P. ANNULICORNIS*, *Burmeister*. (*Ascal. annulicornis*, *Burm. Handb.* ii. p. 1001.—*Myrmeleon capense*, *Thunbg. Nov. Act. Holm.*—*Ascal. capensis*, *Burm. op. cit.* p. 1002 (nec *Fab.*).—*P. capensis*, *Lefebv. Guérin's Mag.* 1842.—*Bubo capensis*, *Ramb. Nérop.* p. 854.—*Ascal. involvens*, *Walk. Cat. Brit. Mus. Neurop.* p. 422 (♀).)

*Hab.* South Africa.

This is the species that has been universally mistaken for the true *capensis* of Fabricius. I adopt Burmeister's name, though it is hardly applicable, as the antennæ are scarcely "annulate." It is, I think, also certainly Thunberg's *capensis*; his name is independent of that of Fabricius. It appears to be a common South-African species, and varies much in size and otherwise. The following conditions are known to me:—

1. Alæ fere vitreæ, ♂, ♀.
2. Alæ uniformiter pallide brunneo tinctæ, ♂.
3. Alæ posticæ nebula magna ante apicem, fuliginosa, ornata, ♀ (= *involvens*, Walker).
4. Alæ posticæ fere uniformiter pallide fuliginoso-suffusæ, ♀.



A note, in the handwriting of M. Guenzius, attached to an example from Natal in the British Museum, gives the following information respecting the habits of the species:—"Hides by day in the fissures of the bark of old trees, with the body curved upwards; difficult to find. In the morning and evening twilight it chases insects, dragonfly-like, around branches of trees."

Genus *HELCOPTERYX*, n. g.

(*Bubo*, *part.*, *Ramb.*, *Hag.*)

*Wings* elongate, rather narrow towards the base, the extreme base of the inner margin with a small excision followed by a slight dilatation, but not appendiculate; network dense; branch of the lower cubitus confluent with the postcosta in the posterior wings.

*Antennæ* considerably shorter than the wings, straight, the base furnished with verticillate hairs; club nearly roundly capitate; a dense tuft of hairs on the face and between the antennæ.

*Eyes* small; the divisions nearly equal.

*Thorax* robust, villose, especially on the breast.

*Abdomen* of the ♂ slender, as long as the anterior wings, the three terminal segments furnished with a narrow wing-like dilatation of the lateral margins, gradually becoming broader to the apex, which is furnished with short, straight and cylindrical divergent appendices; the second segment is dilated above into a hump posteriorly, giving the abdomen the appearance of being geniculate. In the ♀ the abdomen is simple, rather obese, excepting at the apex.

*Legs* with the spurs of the posterior tibiæ about the length of the first two tarsal joints.

*Hab.* South Africa.

*Species.*

1. *H. RHODIGRAMMA*, *Rambur*. (*Bubo rhodiogrammus*, *Ramb. Nérop.* p. 355)

*Hab.* Cape of Good Hope; Natal.

Rambur's description is sufficiently precise, only that his type was a female. In the ♂ I do not see the "taches en forme de fer-à-cheval, d'un noir velouté" of which he speaks. The ♂ abdomen in two examples in my collection is uniformly fuscous, somewhat reddish above towards the base, and with a tendency to become pruinose beneath; the hump on the second segment is

beset with short black spine-like hairs ; the wing-like lateral dilations of the three terminal segments are reddish brown ; from the last segment beneath projects a triangular valve ; the appendices brown, furnished with tufts of black hairs at the tips.

### Genus *Puer*, *Lefebvre*.

*Wings* elongately subtriangular ; costal margin not dilated at the base : network very open ; transverse branch of the lower cubitus confluent with the postcosta in all the wings : posterior wings very much shorter than the anterior.

*Antennæ* shorter than the wings, nearly straight, simple ; club very broad ; face very densely villose.

*Eyes* having the upper division more than twice as large as the lower.

*Thorax* slightly villose above, more densely so on the breast.

*Abdomen* with dense tufts of hairs along the sides ; ♂ without appendices : very short and broad in the ♀.

*Legs* with the spurs of the posterior tibiæ much shorter than the first tarsal joint.

*Hab.* South of France.

### *Species.*

1. *P. MACULATUS*, *Olivier*. (*Ascal. maculatus*, *Oliv. Encyc. Method.* i. p. 246.—*P. maculatus*, *Ramb. Nérop.* p. 352, pl. ix. fig. 2.—*A. niger*, *Borkh. Scrib. Beitr.* ii. p. 156, tab. xi. fig. 2 ; *Burm. Handb.* ii. p. 1002.)

This beautiful insect seems to be confined to Provence and the neighbouring districts.

I know not for what reason Hagen (*Stett. Zeit.* 1860, p. 53) has deposed Olivier's name in favour of Borkhausen's ; the former was published at least two years *before* the latter, and the description is quite satisfactory.

### Genus *ASCALAPHODES*, n. g.

Allied to *Puer*. In the ♂ the antennæ have each joint internally, excepting those towards the apex, provided with a sharp, back-directed tooth ; and the abdomen has a pair of short very stout appendices, the tips of which are thickened and approximate ; the hairs of the abdomen are not arranged in tufts.

*Hab.* India.

### *Species.*

1. *A. CANIFRONS*, *Westwood*. (*Ascal. (Bubo) canifrons*, *Westw. Cab. Or. Ent.* pl. xxxiv. fig. 3.)

Westwood's type is a ♀. A ♂ in the British Museum is much smaller (exp. alar. antic. 13'''), in fact the least of all the Ascalaphidæ; the posterior wings have the basal third opaque white, showing the affinity of the genus to *Ascalaphus* (restricted).

Genus ASCALAPHUS, *Fab.* (restricted).

*Wings* subtriangular, with yellow or white and black (often opaque) markings; costal margin dilated at the base, afterwards constricted; network very close: transverse branch of lower cubitus running obliquely into the inner margin, after the termination of the postcosta, in all the wings.

*Antennæ* strong, as long as the wings (or slightly longer or shorter), without hairs at the base; somewhat arcuate at the base, especially in the ♂: club short and broad, almost truncate: a dense tuft of hairs between the antennæ and on the face.

*Eyes* having the superior division much larger than the inferior.

*Thorax* villose.

*Abdomen* short and densely villose, obese in the ♀; in the ♂ with a pair of slender, cylindrical, forcipate terminal appendices.

*Legs* very short, with the spurs of the posterior tibiæ scarcely so long as the first tarsal joint.

*Hab.* Mediterranean district; extending into Central Europe and Siberia.

The striking and papilioniform species of this genus are familiar to every entomologist.

*Species.*

I content myself here by enumerating the species according to Hagen's list in the 'Stettiner entomolog. Zeitung' for 1860, pp. 47, 48, without reproducing the complicated synonymy he there elucidates, and which I have not yet tested. However, I have united *corsicus* and *siculus* of Rambur, not being able to find any character whatever, after an examination of the type specimens, by which to distinguish them. The species appear to separate themselves into two ill-defined groups, characterized by the presence or absence of opaque coloration of the wings: many of them are closely related one to another, and seem to thoroughly confirm my opinion expressed in the introductory portion of this paper, that local influences tend to produce modifications or "local species" in the Ascalaphidæ.

Hagen recognizes the following, most of which I have seen:—

1. *A. MACARONIUS*, Scop. (*Ent. Carn.* p. 168, fig. 446; *Papilio*!)  
*Hab.* Austria, Dalmatia, Hungary, Turkey, Russia.
2. *A. KOLYVANENSIS*, Laxmann (*Nov. Comment. Acad. Petrop.* xiv. p. 599, tab. xxv. fig. 9).  
*Hab.* Russia, Asia Minor, Turkey, Greece, Hungary, Dalmatia, &c.
3. *A. PUPILLATUS*, Ramb. (*Névrope*. p. 346, pl. x. fig. 7).  
*Hab.* South Russia and Hungary.
4. *A. LONGICORNIS*, Linn. (*Mus. Lud. Utr.* p. 402).  
*Hab.* France (extending northwards to Paris), Spain, Algiers, Italy, &c.
5. *A. RHOMBOIDEUS*, Schneider (*Stett. ent. Zeit.* 1845, p. 153).  
*Hab.* Rhodes, Hungary.
6. *A. COCCAJUS*, Wiener Verzeichniss, p. 187 (*Papilio*!).  
*Hab.* Germany (extending northwards to Thuringia); Switzerland; France, Spain, Italy, Greece.
7. *A. BÆTICUS*, Ramb. (*Névrope*. p. 345).  
*Hab.* Andalusia.
8. *A. LACTEUS*, Brullé (*Exp. Morée*, p. 278, tab. xxxii. fig. 3).  
*Hab.* Greece, Turkey, Asia Minor, Dalmatia, Italy, South Russia.
9. *A. ITALICUS*, Fab. (*Spec. Ins.* p. 400).  
*Hab.* Italy, Sicily.
10. *A. SIBIRICUS*, Eversm. (*Bull. Moscou*, xxiii. p. 279, tab. v. fig. 2).  
*Hab.* Kiachta, Mongolia.
11. *A. ICTERICUS*, Charp. (*Hor. Ent.* p. 59).  
*Hab.* South France, Portugal, Spain, Algiers, Barbary, Italy, Sicily, Greece.
12. *A. HISPANICUS*, Ramb. (*Névrope*. p. 350, pl. ix. fig. 4).  
*Hab.* Spain.
13. *A. USTULATUS*, Eversm. (*Bull. Moscou*, xxiii. p. 278, tab. v. fig. 4).  
*Hab.* South Caucasus.
14. *A. CORSICUS*, Ramb. (*Névrope*. p. 349, pl. xi. fig. 3), = *siculus*, Rbr.  
*Hab.* Corsica, Sardinia, Sicily, Greece.
15. *A. SYRIACUS*, nov. sp. *Antennæ* nigræ. *Frons* griscescenti-villosus. *Vertex* nigro-villosus. *Thorax* niger, supra aurantiaco-sexmaculatus, infra flavo-maculatus. *Pedes* flavi; *femorum* dimidio basali, *tibiis* ad apicem, *tarsisque* nigris. *Abdomen* nigrum. *Alæ* anticæ hyalinæ, nitidæ; parte tertia basali lactea, extus convexa; macula ad basin nigro-fusca; venis venulisque plerumque albis vel flavidis, cubito superiore

nigro; pterostigmate lacteo: posticæ fere æqualiter tricoloratæ, nitidæ, ad basin nigro-fuscæ, in medio lacteæ, pallide venatæ; ad apicem omnium fuliginosæ, nigro-venatæ; pterostigmate fusco (♂).

Long. corp. 9''; exp. alar. antic. 18''.

*Hab.* Syria (Huleh, Lowne).

Of the group of *A. lacteus*, Brullé, but very distinct from any described species; the uniformly fuliginous apical third of the posterior wings is especially characteristic; this colour is somewhat irregular within, and is carried as a narrow and gradually diminishing line some little distance along the inner margin.

### INDEX TO SPECIES.

The names *in italics* indicate synonyms: the other names are those that I consider should be applied to the species; but some of these it is not possible to identify, and they are merely cited as guides to future workers.

N.B. The names of the species of the genus *Ascalaphus* (*sensu stricto*), and their synonyms, are not included in this index (*cf. antè*, p. 273). Neither is any notice taken of the numerous Catalogue and Museum names cited by Hagen ('Hemer. Synop. Synonymica'), it being considered that the perpetuation of such names is not only useless, but also pernicious.

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Notes on the Geographical Distribution and Dispersion of Insects ; chiefly in reference to a Paper by Mr. ANDREW MURRAY, F.L.S., "On the Geographical Relations of the Chief Coleopterous Faunæ" (Journ. Linn. Soc. vol. xi. (Zoology), No. 49.). By ROLAND TRIMEN, F.L.S., F.Z.S., M.E.S.

[Read April 20, 1871.]

HAVING attentively perused the above-mentioned treatise, I think that the following notes may perhaps be useful. I must

premise that they have nothing specially to do with the distribution of Beetles (a subject which Mr. Murray handles with his wonted care and skill), but refer only to some matters of more general import incidentally touched upon in the paper.

The drift of Mr. Murray's main argument (as summarized at p. 7) is to account for the greater part of the difficulties presented by the known existing distribution of animals and plants over the globe, by the simple explanation of "continuity of soil at some former period." While all will admit that very great changes have taken place in the relative extent and position of land and sea during various periods of the past, I think that I concur with many naturalists, when I venture to express the opinion that too frequent recourse has been had of late to that broad and general admission as a mode of solving the difficulties in question, and that a rather wholesale creation of ancient continents has been the result. The process of disposing of such problems by "calling up" connecting lands "from the vasty deep," in which it is assumed they have been submerged, has doubtless something attractive about it, and it possesses the manifest advantage of affording the fanciful geographer an inexhaustible field wherein to disport himself,—

"The world is all before him, where to choose."

In saying this, I have no wish to undervalue the importance of the influence on distribution necessarily exercised by changes in the level of the land, there being so many facts only explicable on the admission of those changes; but I think that great caution should be exercised in assuming the former existence of great connecting stretches of land in order to account for cases of generic or specific affinity at distant points of the earth's surface.

Mr. Murray's avowed inclination in favour of the "continuity" theory appears to me to make him attach too little importance to other means of dispersal, particularly in the case of oceanic islands\*. I do not propose here to recapitulate Mr.

\* The oceanic islands (at least those of the Atlantic) are regarded by Mr. Murray as the remains of submerged tracts of land; but those who have visited such islands will generally, I think, recognize the force of the following significant observation of Mr. Darwin (*Orig. of Spec.* 4th edit. p. 427), viz.:—"Nor does the almost universally volcanic composition of such islands favour the admission that they are the wrecks of sunken continents; if they had originally existed as mountain-ranges on the land, some at least of the islands would have

Darwin's masterly argument on this subject (Orig. of Spec. chaps. xi. and xii.), but will merely observe that it meets Mr. Murray's remarks, as if by anticipation, at every turn.

In reference to the Atlantic Islands, and particularly to Madeira, Mr. Murray (pp. 4 & 12) inquires with some emphasis how it is that the endemic insular forms have not "found their way to Europe" as easily as European species have found their way to the islands, and states that "not a single example of any of its [Madeira's] peculiar species" has ever so found its way, "except in an entomologist's box." Without inquiring too closely how it was possible to ascertain the truth of the latter statement, it should be observed that the question here is not so much one of travelling as of establishment of an organism in a country foreign to it; and the answer to the question in this view of it is really furnished by Mr. Murray himself (p. 62). Following in Mr. Darwin's wake, he clearly shows how easily and promptly unoccupied ground is seized upon by immigrants, and how extremely difficult, on the contrary, it is for a foreign form to effect an entrance, and still more to establish itself, on land already well occupied. Oceanic islands are notoriously poorly stocked, while Europe, for by far its greater portion, is rich in flourishing forms; so that, allowing the available means of transport to and from Madeira to be equally great, it was scarcely to be expected that Madeiran special forms should have the same force to accomplish a permanent settlement on European soil as continental species would possess to naturalize themselves on the island.

I regret that, on the two occasions on which I landed at Ascension, my time was too limited to make any but the most superficial exploration of a small portion of its area. I observed no terrestrial animals of any sort, with the exception of thousands of *Musca domestica* and its allies *M. vomitoria* and *M. Cæsar*, and a few of *Dermestes lardarius*, all four such devoted followers of mankind, that it is safe to regard them as introductions. I was, however, informed by a resident that butterflies were occa-

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been formed, like other mountain-summits, of granite, metamorphic schists, old fossiliferous or other such rocks, instead of consisting of mere piles of volcanic matter." I notice a remark recently published ('Nature,' Dec. 22, 1870, p. 148) by Dr. Hooker to the effect that the Seychelles group is formed of granite and quartz—a fact that widely distinguishes it from the Mascarene group of volcanic formation.

sionally seen\*. Mr. Darwin has recorded (Nat. Voy. p. 587) that "a few grasshoppers occur a little inland at Ascension," and that "rats and land-crabs swarm in numbers." The island bears all the marks of having been the seat of volcanic action at a comparatively recent time; and the poverty of its fauna and flora may very probably be due to the shortness of the period during which it has been in a condition fit for the reception and support of organic life, as well as to its very restricted area. Sea-birds are very numerous, and some of them, I was told, nest on the island. The marine fauna, from the little that I could observe of it, struck me as one that would repay a systematic research. I believe that both the mollusks mentioned by Mr. Murray (p. 15), certainly the *Nerita*, were among those which I found crawling in abundance on the rough tufa-rocks near the turtle-ponds, and subsequently presented to the British Museum. A bivalve, which appeared to be a true oyster, was plentiful just about the water-line; and numerous shells of other mollusca, bleached to whiteness, lay in the rock crevices; while the general abundance of that class of animals was amply evidenced by the long beach of the well-known "Ascension sand," which appeared to consist solely of rolled and polished fragments of shells. Several splendidly coloured fish, resembling *Acanthurus*, were taken by the hook over the side of the steamer at her anchorage; and many others could be discerned in the clear water near the shore, as well as companies of gaily striped and spotted small species in the turtle-ponds. But the most striking and active animal I noticed was a species of crab (of the genus *Ocypoda*?) which swarmed on the hot rocks, close to the sea, in the full sunshine. These crabs possess an amazing agility, reminding one in their actions of the quickest hunting spiders, and evade with remarkable success any attempt to seize them; I even found it difficult to strike them with a stick. Their colouring is protective, being a dark reddish-purple, thickly spotted with white, and nearly resembling that of the rocks which they frequent, the spots representing the numerous orifices in the porous tufa.

In reference to St. Helena, Mr. Murray observes (p. 22):

\* I remember to have read, in an account of a visit to Green Mountain (upon which I cannot now lay my hand), that variegated reddish butterflies were observed on the ascent. In all probability these were *Pyrameis Cardui*. Green Mountain has on it a scanty native vegetation, as well as introduced vegetables and garden-flowers.



"The butterflies seem as badly represented as the birds; and I would recommended to the consideration of the advocates of introduction by chance dispersal the fact that the two classes of animals best provided with means of dispersal are precisely those which, along with the mammals, are least represented. I can find no published notice of any Lepidoptera in St. Helena. No specimens of any exist in the British Museum; and the solitary species that I can learn by inquiry to have been met with is the *Cynthia Cardui*." On this I wish to remark that, on the 1st August 1859, in a garden towards the higher part of the valley in which James Town is situated, I captured, during less than half an hour, five species of Lepidoptera, and secured the larva of a sixth species. Concerning these, I find in my journal that *Danaïs Chrysippus* and *Pyrameis Cardui* were abundant, *Lycæna bætica* common, *Hymenia recurvalis* not uncommon, and *Botys otreusalis* "in hosts." The larva was that of a Quadrid Noctua, and resulted in *Achæa Melicerta*, Drury; it was resting on a grass (*Coix lachryma*) known as "Job's Tears." A fourth butterfly, *Diadema Misippus* (*D. Bolina*, auct.), I found among the relics of the Burchell Collection, so religiously preserved at Oxford by Professor Westwood. The three butterflies taken by myself have been recorded as inhabitants of St. Helena in my 'Rhopalocera Africæ Australis' (pt. i. pp. 90 & 121, and pt. ii. p. 237), and the *Diadema* in my paper "on Mimetic Analogies among African Butterflies," published in the 'Transactions of the Linnean Society' (vol. xxvi. pp. 504 & 513, note), where I show how curiously that butterfly's range corresponds with the distribution of its model, *Chrysippus*. In looking at this scanty list of species\*, which I cannot doubt could be considerably increased by any collector resident in the island, it is very noticeable that all seven are prolific and widely dispersed insects†, whose present distribution evinces their special aptitude for seizing upon and persistently occupying new stations, and that they are thus the very description of forms which one would

\* Godart states (Encyc. Méth. ix. p. 709) that *Urania Rhipheus*, "selon M. Bory de Saint-Vincent, se trouverait à Sainte-Hélène;" but some confirmation of this report must be received before we can make so magnificent an addition to the fauna of the island.

† *Pyrameis Cardui* and *Hymenia recurvalis* are found all over the world; a range only second to theirs characterizes *Danaïs Chrysippus*, *Diadema Misippus*, and *Lycæna bætica*; *Achæa Melicerta* is recorded from the Punjaub, Ceylon, Celebes, and Moreton Bay; and *Botys otreusalis* inhabits both Congo and the Cape.



expect to be amongst the first to reach and colonize so isolated a spot as St. Helena.

The few insects of other orders known to me as natives of St. Helena are quite of the same stamp as the Lepidoptera as to likelihood of their having been introduced. The brilliant *Sphex*, *Chlorion compressum*, which I noticed on the walls in James Town, is a well-known native of India and Ceylon, and doubtless "came over" with its particular favourites, the cockroaches. *Gryllus capensis*, again (a St.-Helena specimen of which, in the British Museum, is recorded in the official 'Catalogue of Dermaptera Saltatoria,' pt. i. p. 16), is a cricket of world-wide distribution, being known to occur in Southern Europe, Western and Eastern Asia, every quarter of Africa, North and South America, Australia, the Philippine Islands, Borneo, and Mauritius.

As regards the Coleoptera of the island, I am not in a position to speak from personal observation; but it is clear, from Mr. Murray's own remarks and those which he quotes from Mr. Wollaston (pp. 22-24), that a very considerable proportion of the species may safely be regarded as introductions from other countries.

While touching on the subject of dispersal, I wish to observe that the frequent occurrence of insects out at sea, very far from land, scarcely receives the attention which it deserves, and that my own slight experience assures me that a careful record of instances of the kind would prove very instructive and valuable. In the journal of a voyage, made in the year 1858, from England to the Cape, I noted the various insects that made their appearance on board the ship in which I sailed. They were as follows (I add the date and approximate distance from the nearest land\* in each case), viz.:—

1. *Pyrameis Cardui*. May 28th. About 90 miles west of Teneriffe.
2. A pale-yellow Moth, apparently a *Bombyx*, about the size of the Silkworm Moth (*B. Mori*). Same date and position.
3. *Botys* sp. *ignot.* June 5th. About 230 miles from the mouth of the river Gambia.
4. A small Longicorn Beetle (*gen. ignot.*). June 6th. About 230 miles from the mouth of the river Jeba.

\* The distance is roughly calculated from the recorded position of the ship at noon on each of the days mentioned.

5. A large Sphinx (perhaps *Sphinx Convolvuli*). June 7th. About 420 miles from Sierra Leone.
6. *Sphinx Convolvuli*. June 8th. About the same distance from Sierra Leone as on the preceding day.
7. *Clytus sp. ignot.* (smaller than *C. Arietis*). June 25th. About 150 miles from Bahia.

In addition to the above, I occasionally saw large insects which I could not determine, but which I usually thought to be Sphinges of some description, whisk rapidly about the rigging, and was besides often told of "butterflies" and other insects noticed by the passengers and sailors. *Pyrameis Cardui* after settling for a few seconds on the binnacle, and *Sphinx Convolvuli* after hovering about some vegetables hanging in one of the boats amidships, alike sped away westward. On this voyage, it should be noted that the ship was a perfectly new one, and had never left England before.

A specimen of *Acridium peregrinum*, in the collection of the British Museum, is noted (Cat. Dermapt. Saltat. iii. p. 577) as having been taken "500 miles from land;" but the latitude and longitude are not mentioned.

The record of such occurrences of insects is much to be desired as an aid to better knowledge of the dispersal of species; and I would commend the subject to the attention of travellers across the ocean.

At p. 55, Mr. Murray notes what he considers "a very remarkable African affinity" in the Lepidoptera of Australia, in reference to the case of the larva of *Dorato-phora vulnerans*, Lewin. The instances which he cites as analogous, however, are very different in character; for he quotes the mention by Livingstone "of a caterpillar called *Rigura* producing fearful agony if a sore is touched *with its entrails*," and the statement made by Baynes and other travellers, that a caterpillar is used by the Bushmen to poison their arrows. It is evident that, if a caterpillar be used at all for poisoning arrows (concerning which report my inquiries have hitherto been attended by no satisfactory result), it must be the intestines or juices of the animal which are so employed. But the case of *Dorato-phora* \* *vulnerans* is the common one of (what appears to be mechanical) irritation by means of clusters of spines, a defence possessed by many caterpillars, not only in Australia and South

\* The name of the genus is thus given by Duncan and Walker.

Africa, but throughout the globe, and of which the larva of the European *Cnethocampa processionea* presents a familiar example. Duncan (Nat. Libr., Ent. vol. vii. Exotic Moths, pp. 181-2, pl. xxii. f. 5) represents the larva of *D. vulnerans* as possessing four fascicles of rufous spines, exsertile at will, on both the anterior and posterior portions of the body, and quotes Lewin to the effect that the wound *inflicted by the fascicles* is very painful. According to Mr. Murray's account it would appear that the African larvæ, from the handling of which Dr. Welwitsch experienced such suffering, were near allies (if not actually species) of *Doratifera*; and the conclusion is obvious that it was by fascicles of spines that the pain was occasioned—not an uncommon case in the warmer parts of the world, and one by no means indicative of any special relation between the Lepidopterous faunas of South-Africa and Australia.

In explaining the presence of a "Brazilian type" or "element" in the Coleopterous fauna of Western Africa, Mr. Murray (p. 63) states that this South-American relation "has also now been recognized in the Lepidoptera;" but he points out neither on what grounds, nor by whom, the recognition has been made. Among the *Rhopalocera*, I am not aware of any genus characteristic of Brazil that occurs in Western Africa\*; unless, with Hoffer, we refer the species of Boisduval's genus *Crenis* to the genus *Eunica*, Hübner.

Referring to *Urania Rhipheus* of Madagascar, Mr. Murray observes (p. 68) that "it is an unusual thing at any time to meet with a gay-coloured Moth; but one with metallic brilliancy is still rarer." The former part of this remark certainly does not hold good, even with regard to Europe, when one recalls the *Deilephila* and other Sphinges, the "Burnets," the "Tiger Moths," the *Catocala*, the brightly tinted *Geometra* of many genera, and various diurnal *Pyrallidæ*; while, for metallic adornment, the *Plusia* and very many *Tineina* can be cited. But when we turn to tropical and subtropical regions, the proportion of brightly coloured moths is in nearly all groups greatly increased; and

\* The Nymphalide genus *Eurema*, Doubl. (which is scarcely separable from *Pyrameis*), is common to both regions, and also inhabits the West Indies; but as there are three known African species to five American, it is difficult to assign the genus to either fauna. The genus *Acraea*, which has representatives in South-eastern Asia and in Australia; is specially African, and the South-American species belong to a very distinct section, which Mr. Butler (Cat. Fab. D. Lep. B. M. p. 128) separates as *Actinote*, Hübner.

most of these are diurnal in flight, and more than rival the majority of butterflies in their gorgeous hues; while whole families (*e. g.* the *Glaucopidæ*) glitter with metallic hues vying with those of humming-birds. I am at the same time disposed to indorse the judgment of Dr. Boisduval, M. Guenée, and Mr. Murray, that the preeminence for surpassing beauty of right belongs to *Urania Rhipheus*.

Looking, however, to Mr. Murray's argument of the evidence of a Brazilian element in the fauna of Madagascar afforded by the presence of *Urania*, it is well to bear in mind that such considerable differences (chiefly shown in the stages of larva and pupa) exist between *U. Rhipheus* and the allied *Uranides* in South America and the West Indies, that the eminent lepidopterist M. Guenée has not only separated it from them generically, but as the representative of the distinct family *Uranidæ* (Sp. Gen. Lep. t. ix. p. 10). Nor should it be lost sight of that, if the independent testimony of Drury\* and Cramer is of any value, either *U. Rhipheus* or some very close ally inhabits South-eastern Asia. These statements of Indian and Chinese localities for the insect, considered in connexion with the well-known eastern stations of the allied genera *Alcidis* and *Nyctalemon* (of both which the earlier states are as yet unknown), seem to afford considerable ground for the opinion that the presence of *Urania* in Madagascar may eventually be proved to indicate an Asiatic rather than an American element in the island fauna.

Cape Town, Feb. 14, 1871.

\* It is not necessary here to enter upon the moot question whether Drury's insect is to be regarded as a manufactured specimen, combining the head and body of *Papilio* with the wings of *U. Rhipheus*, or (as Mr. Butler suggests in Cat. Fab. D. Lep. B. M. p. 288) as a butterfly mimicker of the *Urania*, because in either case the presence of *Urania* in China or India, according to the ostensible *habitat*, has to be assumed.

*Additional Note to p. 280.*—Mr. J. C. Melliss, who has been a resident at St. Helena for some years, informs me that Honey-Bees (*Apis*, sp.) and *Acherontia Atropos* were both common in that island for two or three years after his first arrival, but have since disappeared almost simultaneously. The same gentleman has shown me specimens of a *Quadrifid Noctua*, *Ophiodes Hottentota*, Guen., reared from larvæ in St. Helena: this moth is widely distributed in Southern Africa, and is nearly allied to the South-European *O. Tírrhæa*, Cram.—R. T., 5th September, 1871.

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A Catalogue of the Aculeate Hymenoptera and Ichneumonidæ of India and the Eastern Archipelago. By F. SMITH, with Introductory Remarks by A. R. WALLACE. (Communicated by W. W. SAUNDERS, Esq.)

[Read December 16, 1869.]

1. *Introduction.* By A. R. WALLACE.

As almost all the insects in this catalogue which inhabit the Malayan archipelago were collected by me, I have been requested to make a few observations on them. In doing so I would wish to state that, though I collected all orders of insects, my time was too much occupied with those branches of natural history in which I was more especially interested, to pay much attention to the habits or economy of the Hymenoptera. All, therefore, I can hope to do, is to give a few superficial observations on their habits and distribution, and on the nature of the localities in which they most abound. As the present is the first of a series of works on the eastern Insects collected by me, it may be well to say a few words on the different places in which I made my collections.

I reached Singapore at the end of April 1854, and spent six months between that island and the district of Malacca. In Singapore I chiefly collected at a spot about the centre of the island, where the low hills are crowned with patches of the lofty virgin forest that a few years before extended over the whole island. I also spent a week on the small island of Pulo-ubim, in the strait to the north of Singapore. The richness of these localities may be estimated from the fact that in nine weeks I collected about 700 species of Coleoptera, of which 130 were Longicornes. Other orders were equally abundant; but the novelty and beauty of the beetles and butterflies attracted my attention chiefly, and I only obtained about 70 species of Hymenoptera, though I have little doubt that an assiduous collector might have doubled that number. The peninsula of Malacca is equally rich; but it is necessary to discover good localities in the neighbourhood of virgin forests. Some of the Malay villages near Mount Ophir would repay a collector for a long visit. The total number of Aculeate Hymenoptera collected by me at Malacca and Singapore was 136 species.

I next visited Borneo, and spent fifteen months in the territory of Sarawak. From October till February was the wet season,



and I obtained comparatively few insects. In March, however, when the dry weather commenced, I went to Si-Munjon, on a river to the east of Sarawak, where some coal-mines were being opened, and found that I had hit upon an excellent spot for insect-collecting. I spent eight months there, living in a little house which I had built for me in a small clearing surrounded by forest, and obtained in that locality almost all the insects which I collected in Borneo. About 2000 Coleoptera, of which near 300 were Longicornes, and 216 species of Aculeate Hymenoptera, will give some idea of my collections in this spot.

After a considerable delay in Singapore, waiting for a vessel, I visited the island of Lombock, which, being highly cultivated and possessing little forest vegetation, produced a very scanty harvest of insects—especially as my two months' stay there was chiefly occupied in obtaining the birds of the island, which were very numerous and interesting. At length, in September 1856, I reached Macassar, in Celebes, which it had long been my anxious desire to visit, as I believed that island to be almost unknown, and likely to yield a rich harvest of novelties. The first appearance of the country, however, was by no means assuring. As far as the eye could reach extended a perfect level of dusty stubble, on which rice had been grown in the wet season. On the horizon, in many directions, was what appeared to be forest, but turned out on examination to be only villages embowered in clumps of fruit-trees. I had many weary excursions over these dusty plains, exposed to a fierce sun, which was never clouded between his rising and setting, before I could discover a spot which seemed at all suitable for collecting in. This was at a village about twelve miles off, and beyond the limits of the Dutch territory, so that I had to obtain permission from the Sultan of Goa before I could reside in it. I spent two months there, suffering greatly from fever, but obtaining very fine collections in all departments of natural history, among which was the collection of Hymenoptera described by Mr. Smith in the 'Proceedings of the Linnean Society' (April 1858), and containing upwards of 100 species. After returning from the Aru Islands, eight months later, I collected in another locality, about twenty miles north of Macassar, near a range of limestone mountains, and in three months (August, September, and October, 1857) added largely to my collection of insects. I obtained here about 120 species of Hymenoptera, of

which no less than 100 were previously undescribed. My best collecting-grounds were the half-dried beds of mountain-streams and the paths in the forest. I owe much of my success here to having had a house built in a patch of forest on the slope of a hill, where I could utilize every spare hour, and often obtained rare insects at odd moments which would otherwise have been wasted. I have shot apes, hornbills, and squirrels without going outside of my veranda, and obtained a considerable proportion of the ants which I collected here within twenty yards of my dwelling. It was two years later that I again visited Celebes, spending four months in the northern part of the island in 1859. I visited three localities in the district of Minahassa, which is perhaps, without exception, the most pleasant and interesting part of the archipelago, and one of the richest and most peculiar in its natural history. The climate is moist, like that of Borneo and Malacca, the soil is rich from the volcanic detritus, and the forests are very luxuriant. The insects I obtained comprised about 85 species of Hymenoptera, most of which were new species. Owing, perhaps, to my having made three separate collections in different localities, Celebes furnished me with more species of Hymenoptera than any other island I visited. I believe myself, however, that it is really richer in this order, because I did not obtain a correspondingly large number of species in the other orders of insects.

The various islands of the Moluccas—Bouru, Amboyna, Ceram, Batchian, and Gilolo—are very similar in general character. They have all a moist climate and a very luxuriant forest vegetation, and are probably all nearly equally productive in insects. The small island of Batchian was the one in which I stayed longest (six months), found the best collecting-ground, and enjoyed the best health, which sufficiently accounts for my having made the best collections there. The new paradise-bird (*Semioptera Wallacei*), the grand butterfly (*Ornithoptera Croesus*), the fine Coleoptera (*Glenea picta* and *Tmesisternus* (*Sphingnotus*) *Dunningi*), and the remarkable *Megachile Pluto* among Hymenoptera are a few of the treasures the capture of which sweetened my residence in this little-known island. The Aru Islands were the first portion of the great Papuan region which I visited; the fauna was entirely new to me, and excessively interesting, and I collected with great assiduity. In my visits at a later period to Dorey in New Guinea, and to Waigiou, I suffered much from

ill health, and had lost the excitement of novelty which had spurred me on during my stay at Aru. My collections therefore must not be taken to represent the comparative richness of these localities, which I believe to be all equally prolific in insect life. At the Aru Islands I collected for six months (January to June 1857), at Dorey three months (April to June 1858), and in Waigiou eleven weeks (July to September 1860). At Mysol, my assistant, Mr. Allen, collected for more than six months in 1860. The large island of Timor yielded me very few insects, although at different times I spent about five months there, visiting both the eastern and western districts. The climate is very arid, and the vegetation scanty, consisting chiefly of *Eucalypti* and *Acacias*; and it much resembles Australia in its physical features. It does not present, however, any of the fine Australian forms of insects, while many of those characteristic of the other islands of the archipelago seem absent. Ill health during my residence there prevented me from making any thing like a complete collection; and it is probable that in Hymenoptera, at all events, much remains to be done in this island. Mr. Allen spent some months in Flores, which he found very similar in character to Timor and equally unproductive of insects. My stay in the large islands of Java and Sumatra was much too short to enable me to make any collections that would give a fair idea of their entomology. They are, however, both excessively rich, and teem with insect life; yet how little they have yet been explored by entomologists may be estimated from the fact that in 1863 Mr. Smith could only find 45 species of Aculeate Hymenoptera which were known to inhabit Java! I believe that an active collector could, in two or three years, collect fully ten times that number in Java alone; and Sumatra is, no doubt, equally rich.

Even the best collections I have been able to make can only be looked upon as samples of the productions of these luxuriant regions. A traveller can do no more than test the productiveness of a country; and we shall never know all the riches of the eastern forests till some assiduous entomologist has devoted several years to a single island. It is greatly to be regretted that, among the numerous Europeans residing in the most fertile parts of the tropics, there are few or none who have devoted themselves in earnest to the exhaustive study of the entomology of their district.

I will now collect together the few observations I made on the habits of the various species of Hymenoptera.

The ants are among the most abundant and omnipresent of tropical insects; and it is impossible for the traveller to avoid noticing them, since he is sure to suffer from their attacks. Those which constitute the family of the FORMICIDÆ do not sting; but their great numbers and activity render them very annoying, and some of them bite very painfully. The *Formica quadriceps* was very abundant on trunks and foliage in the Aru Islands. It carries its abdomen raised up at right angles to the body, and when disturbed appears much enraged, biting with all its force for a long time, but without giving much pain. *F. flavitarsis*, from the same islands, erects both abdomen and head in a threatening manner when disturbed, so as somewhat to resemble the attitude of a *Mantis*. *F. occulta* is a solitary species; and it moves along in a jerking manner, very different from most of its congeners. *F. longipes* was found in very small numbers, wandering among dead leaves in the forest. *Formica lactaria* and *F. circumspecta* were observed in company with Aphides, and feeding on their sweet secretion. These ants were very abundant, swarming on fruit-trees in gardens, and on grass; they also swarm in houses, but are not very destructive. *F. lactaria* makes a nest of leaves joined together with a loose mass of soft papery material. *F. badia* makes a small fragile nest under palm leaves; and in it I observed the larvæ of a small Homopterous insect (a species of Cercopidæ?), the perfect insects being found on the same plant. *F. cruda* and *F. coxalis* were found under bark; *F. pallida* had its nest under stones on the mountains of Celebes. The large *Formica gigas* is common in the forests of Singapore and Borneo among dead leaves and rotten timber. *F. dorycus*, an almost equally large species, was only taken at night, visiting my sugar-basin in New Guinea. Most of the other species of *Formica* were found on foliage or bark in the forests. These ants appear to make up for want of a sting or of great strength by the power of numbers; for I once observed the small workers of *F. subtilis* in Batchian carrying away a large and heavy living beetle (*Geonemus*, sp.), the legs and antennæ being crowded with a double row of the ants so as to render the resistance and struggles of the beetle quite hopeless. The very minute and semitransparent *F. familiaris* inhabits houses in Batchian; it is very active, and annoying



from the impossibility of escaping its attacks, though it is not very destructive.

The genus *Tapinoma* is scarce in the East. The only species which I found in abundance was the *T. glabrata*, which is a house-ant in Malacca, and is called by the Malays "Sumut gila" (the mad ant) from the extraordinary manner in which it rushes about hither and thither apparently without any object. It is not, however, very destructive.

The curious spiny ants forming the genus *Polyrhachis* are very abundant in the whole archipelago, though they never swarm like so many others of the family, and rarely inhabit houses. They seem to be truly arboreal species, and are mostly of a rather large size. Many of them are beautifully sculptured or curiously furrowed; and the fantastically shaped spines with which they are almost all furnished render them very interesting objects for examination. The large *P. bihamatus*, with its curious dorsal hooks, is common in the forests of most of the islands, running slowly upon timber and the trunks of trees. *P. lævigatus* and *P. chalybeus* were found on rocks on Mount Ophir, at an elevation of nearly 4000 feet. *P. scutulatus* was found abundantly at sugar-cane refuse in the Aru Islands. *P. fervens* makes a brown papery nest on branches in Amboyna. That of *P. rugifrons*, found in Ceram, was about two feet long, attached to the vertical trunk of a tree. When disturbed the ants rush out, and, turning the abdomen under the body, strike it against the firm papery nest, producing a loud rattling noise. This nest consisted internally of large irregular cells; and the inmates were not very numerous. It was the largest nest I observed of any species of this genus. *P. sexspinosus* forms a somewhat similar nest, but smaller, and attached to the surface of a large leaf. That of *P. textor* is of an open fibrous material, and only an inch in diameter. *P. Acasta* rolls up a leaf and forms within the cylinder a coarse papery nest. *P. Eudora*, of Batchian, was found under bark, with a nest consisting of a very few, small, imperfect, fragile cells, comprising in all only half a dozen individuals and about as many larvæ. *P. bihamatus*, and some other species, have their nest of a few exposed cells on the trunks of trees, and seem to exist only in very small communities. The other nests of ants of this genus observed by me were:—*P. rugifrons*, a soft papery nest on a smooth tree, about 12 inches long, with several



openings below; *P. Busiris*, a very similar nest to the last, but about half the size; *P. Dolomedes*, a small, oval, papery nest on a leaf; and *P. paromalus*, whose nest, on a tree, consisted of only two small cells of papery matter about an inch in diameter, each cell with a separate opening. These four nests were found in the island of Ceram. A very large number of the species which I collected were found wandering about foliage or trunks and on the ground; and very often single specimens only were obtained. The general characteristics of these ants appear to be, that they live in small communities in exposed situations, and are not very active; while, being of generally large size, they must be very much exposed to the attacks of insectivorous birds and other animals. They have neither sting nor powerful jaws to defend themselves, and, from their limited powers of increase, would seem to be peculiarly liable to extermination, without some special protection. It seems probable that this is the purpose of the curious hooks, spines, and points with which they are armed, and which must no doubt render them unpalatable morsels, very liable to stick in the throats of their captors. The great number of species of ants, and the curious modifications found among them, indicate that they have much inherent tendency to variation; and we may well imagine how, in the severe struggle for existence which is for ever going on where life is so abundant and varied as in the tropics, the most widely distinct modifications have been seized upon by "natural selection" as a means of safety and perpetuation. The power of rapid increase, the habit of making subterranean abodes, or of seeking food only at night, the poisonous sting, the powerful jaws, minuteness of size, or the being armed with spiny processes, are all advantages to their possessors; and the first rudimentary appearance of any of these, in however slight a degree, would inevitably lead to their persistence and perpetuation, and to the further development of such peculiarities by the preservation of all favourable and the destruction of all unfavourable variations.

The new genus, *Echinopla*, consists of a few species somewhat resembling *Polyrhachis*, but wanting the spines, and generally covered with deep striæ or bristles. They are very scarce, being almost all found solitary on leaves in the damp and gloomy forest; and I never observed their nests or obtained any other clue to their habits. They are very sluggish as compared with the activity of most ants.

The *Ecophylla smaragdina* is one of the most widely distributed ants in the archipelago, and is abundant in most forests. When alive the abdomen is of a bright olive-green colour. It makes a nest by gluing together the edges of leaves, often those of Zingiberaceous plants; and when disturbed it rushes out apparently in a great rage, and makes a loud rattling noise by tapping against the leaves. This perhaps serves to frighten away some of its enemies; and it also possesses a rudimentary power of stinging, which gives very little pain. It is an exceedingly active and intelligent-looking species.

The ODONTOMACHIDÆ, comprising the single genus *Odontomachus*, are long and slender ants with enormous hooked jaws. I found them generally wandering about on the ground in the forests. They both bite and sting, the latter being the most painful, as they seem to want muscular power to do more than hold on tight with their jaws. I found a nest of *O. tyrannus* in the Aru Islands, composed of coarse papery fibre, in the fork of a small tree. *O. rixosus* was observed at Ternate coming out of holes eaten into the pith of the sticks of a fence, formed, I believe, of some Bombaceous shrub. Neither species nor individuals of this genus were abundant.

The PONERIDÆ are generally large-sized ants, which are not abundant, but sting very severely. *P. læviceps* was found under rotten bark. *P. maligna* was observed upon rocks in N. Celebes, carrying away Termites. *Amblyopone castanea* was found in abundance under rotten bark and fern-roots. The new genus, *Mesoxena*, was taken at night, visiting my sugar-jar.

We now come to the MYRMECIDÆ, the destroying ants "par excellence," and the most abundant in individuals of the whole group. The genus *Myrmica* consists chiefly of small red or yellow species, many of which are preeminently house-ants, and are a constant nuisance to the resident in the tropics. *M. ruficeps* and *M. pedestris* were found under rotten bark, almost solitary, and each with a few eggs. *M. pellucida* and *M. agilis* are small house-ants, and not very destructive. *M. vexator* and *M. vastator* well deserve their names. They swarm in houses almost everywhere, and, to the naturalist especially, are a constant source of trouble. Nothing but isolation by water, or, better still, by oil, will preserve any animal or vegetable substance from their attacks. They also sting most acutely, and

are constantly wandering over one's body and giving unexpected punishment in tender places.

The species of *Podomyrma* are forest insects, and were found chiefly in dry and elevated districts. They run rapidly on branches of trees ; but nothing more is known of their habits.

The genus *Pseudomyrma* consists of long and slender short-legged ants, found crawling on foliage and timber, and generally solitary or in small numbers.

The genus *Crematogaster* consists of small-sized ants, which are sometimes very abundant, and sting severely. The *C. inflatus* has a remarkable swollen thorax of an ochre-yellow colour. It was found running rapidly about dead branches. Another species, *C. irritabilis*, was found in New Guinea, abounding in the forests, where it makes large nests of black crusty cells in the trunks and branches of lofty trees. Soon after I had built my house at Dorey this species took possession of it, building large nests in the roof, and making covered ways down the posts and across the floor. They also filled up the grooves of my setting-boards with their cells, and stored them with spiders. For three months I was subject to the constant attacks of these little pests, which coursed about over my table, in my bed, and all over my body. This was all very well, and could have been borne without any complaint ; but every now and then, meeting with some obstruction in their path, they would give a sting so severe as to produce a spasmodic start, and necessitate an instant search after the enemy, who was generally to be found holding on tight by his jaws, and thrusting in his sting with all the vigour he was possessed of.

The *Myrmicarie* are active ants, resembling at first sight the smaller species of *Polyrhachis*. They were found generally on foliage. *M. rugosa* was observed in Batchian running on fallen timber, carrying the abdomen turned in under the thorax.

The genus *Pheidole* comprises those remarkable ants which possess workers of several forms, and often differing greatly in size and structure. Some of them live under rotten bark, others in the ground ; and they all seem to be very active and voracious, and to have a very severe sting. In the island of Batchian I found five species of *Pheidole*, which were more abundant there than in any other locality. In *P. rubra*, found abundantly under rotten bark, the two sorts of workers do not differ much in form, but the larger ones are at least ten times the bulk of the smaller.

*P. megacephala* has two distinct sets of workers, which differ structurally; and each of these presents remarkable differences of size, the small workers having a larger and a smaller form, while the large ones exist of four distinct sizes; so that in this one species we have a series of individuals of six distinct sizes, which differ so greatly that I am sure I am under the mark when I say that it would take one hundred of the smallest to equal in bulk one of the largest. This species was taken under bark, and was also found in Celebes travelling across a roadway in the forest; and here the large and small individuals were obtained together.

In the last-named species, though the head is rather disproportionately increased, it is the whole body of the insect which presents such a striking difference of bulk. In *P. notabilis*, however, while the body and abdomen of the large worker are only slightly increased, the head is most enormously developed, as shown by Mr. Smith's figure (Journ. Linn. Soc. Zool. vol. v. pl. 1. f. 3). This species was also taken crossing a pathway in the forest. *P. pabulator* combines these differences, the larger worker having an excessively large head as well as a much larger body. The large head of these insects renders them sluggish and incapable of keeping up with the more active small workers; and I observed that half a dozen of the latter often surrounded those of the largest size and dragged them along, as if they were fatigued or wounded soldiers. This fact of the helplessness of these giant ants, and their very often having smooth toothless jaws, renders Mr. Bates's explanation of their probable function in the colony highly probable, viz. that they serve as mere baits to ant-eating animals, being naturally attacked and often carried off first, and thus allowing the working portion of the community to escape destruction. Another species, *P. plagiaria*, is small, but very active and voracious, and the large worker is only about twice as large as the small one. I observed them once plundering a white-ant's nest in a rotten tree, down which they were proceeding in a continual stream, carrying away the soft and helpless *Termites*. On another occasion they had discovered a large Coleopterous larva (*Passalus*, sp.), and hundreds were engaged in dragging him out of his abode in a rotten stump.

The genus *Solenopsis* very much resembles the last, but the species are generally red instead of brown or black. *S. cephalotes* is one of the most abundant ants in the Moluccas, and is the most terrible pest. It forms its colonies under ground, en-



tering houses from under the floors, and devouring every thing eatable. Its sting also is excessively painful, so that it bears the name of the "fire ant." When once a house is infested with them, there is nothing to be done but to support all boxes, tables, &c. on blocks of wood or stone placed in dishes of water, as even the perspiration on clothes is sufficiently attractive to them; and woe to the poor fellow who puts on garments in which a dozen of these are lodged! It required the most watchful care to keep my collections from the attacks of this insect, as they would devour all the soft parts about the beaks and eyes of bird-skins, and were so particularly fond of fresh Lepidoptera that I have often lost the results of a day's good work by leaving my collecting-box unprotected for half an hour after my return home. *S. pungens* and several other species also frequent houses, and are very destructive, so that in the islands from Celebes eastwards it is hardly possible to preserve collections of natural history without being incessantly on the alert and taking especial precautions against the attack of these ants. *S. laboriosa*, found in Batchian, presents an almost complete series of workers, nine in number, taken from one nest, the largest of which have immense heads and large abdomens, and are four times the length, and probably at least a hundred times the bulk and weight, of the smallest.

The last family of ants, the CRYPTOCERIDÆ, are represented in the Eastern archipelago by the three genera *Meranoplus*, *Cataulacus* and *Cephaloxys*. They are scarce both in individuals and species, and are generally found on foliage or timber, solitary and often motionless.

On the remaining families of Hymenoptera I have few observations. The MUTILLIDÆ were rather abundant, the apterous females running about the ground in sandy places or pathways in the hottest sunshine; the males fly actively about shrubs and foliage, and were often seen carrying off the females. The sexes often differ extraordinarily both in size and coloration; and I took every opportunity of capturing them together, so as accurately to determine their sexual relations.

The SCOLIADÆ were generally captured at flowers, especially of cinchonaceous shrubs. The smaller species, however, were often found on sandy pathways. The larger species, such as *Scolia procera*, *S. speciosa*, &c., are among the most striking of tropical insects.



Different forms of the POMPILIDÆ are everywhere abundant in the eastern tropics. The species of *Pompilus*, *Macromerys*, and *Mygimnia* were generally taken in the thick forest, often flying along near the ground and among herbage, carrying some captured insect. The *Ogenias* are often seen dragging along spiders. The *Ammophilas* frequent weedy herbage in hot sunshine. *Pelopæus bengalensis* and other small species were taken in similar situations. *Pelopæus javanus* enters houses, where it makes small earthen cells, which it stores with spiders rendered torpid. On opening one of these, a small larva was found, with its food. In another instance a cell in my room, after being stopped up, was completely plastered over with mud in an irregular manner, so as to hide its shape. After a fortnight I opened it and found within it a delicate brown cocoon  $\frac{7}{10}$  inch long, containing a white grub  $\frac{2}{3}$  the length of the cocoon. The clay cell was very hard and solid; and it seems extraordinary how the insect could have escaped from it. *P. intrudens* is the species which takes its place in Celebes, where I have observed it to bring both caterpillars and spiders to its cell. *Sphex* is a very abundant and characteristic genus, abounding in open sandy places, where they fly about in great numbers, and with enormous velocity and vigour. *S. argentata* and *S. gratiosa* were common in the sandy street of Dobbo in the Aru Islands. *S. argentata* was found also at flowering shrubs in Celebes; other species were found in forest-paths, and on the sandy banks of drying-up streams.

The BEMBICIDÆ were found burrowing in loose sand, *Bembex melancholica* being common in such situations all over the archipelago.

The EUMENIDÆ are the most abundant, beautiful, and characteristic Hymenoptera of the East. They are found everywhere, in gardens, on roadsides, on the margins of streams, and in the forests. They are very difficult to capture safely, having great power of elongating the abdomen, so that they will twist it round and sting in every direction within a sphere of at least two inches diameter round the thorax. *E. quadrispinosus* and *E. blanchardi* build pendent cones of soft papery texture on the thatch of houses, as a covering to three or four small, open, earthy cells, in each of which they deposit an egg.

*Rhynchium* and *Odynerus* are very abundant in species and individuals, and frequent similar situations.

The VESPIDÆ are chiefly represented by the genera *Icaria* and

*Polistes*. These are smaller and much less powerful and vigorous than the Eumenidæ. They build small stalked nests of eight or ten hexagonal papery cells, with a few outer imperfect ones. These are generally attached to the underside of leaves, or to a dry twig, and they seem to remain always open and exposed. *Icaria impetuosa*, *Polistes sagittarius*, and *P. multipictus* were observed to have nests of this character. The large species *Polistes Picteti* has a nest consisting of a much larger number of cells; and in the island of Goram I observed the natives eating the pupæ as a great luxury. *Vespa doryloides* is a curious species, of weak structure and nocturnal habits, since I only took it when attracted to the lamp at night.

Among the Eastern APIDÆ the most abundant and characteristic genus is *Megachile*. These are bees of a black colour, with a flattish body and a very large head. They have a very acute sting, and often enter houses. They seem to vary in their habits. *M. scabrosa* bores holes in posts of houses. *M. lachesis* makes a small round hole in hard clayey ground. *M. tuberculata*? makes cells of very sticky black wax. In Borneo it annoyed me much by getting in among my books and forming its cells on the edges, in the groove formed by the projecting covers. Others filled up the grooves in my setting-boards, and day after day persevered in rebuilding what I had cleared away. They fly very quickly and buzz loudly. *M. fulvifrons* and *M. terminalis* were taken about houses in Macassar. The giant *Megachile Pluto* was only seen once, in the island of Batchian. It was obtained during an excursion to a tract of mountainous forests, and was watched flying round and round with a loud humming noise like that produced by a *Geotrupes*, till at last it was fortunately captured on the wing.

*Ceratina viridis* was taken at low herbage near Macassar. The *Xylocopas* are abundant everywhere in the forests, and especially about cultivated grounds. The smaller species bore holes in posts of houses. *X. latipes* makes long round holes in dead trees. The beautiful *X. cerulea* is common about the town of Singapore.

True honey-bees are found in the western half of the archipelago, and in the south-east as far as Timor, where, however, it is possible they may have been introduced. *A. dorsata* and *A. testacea* both construct large combs suspended from the underside of the branches of lofty forest-trees. They sting very severely;

yet the natives ascend the trees, and with nearly naked bodies take away the combs, protected only by a smouldering torch, the smoke from which in some degree keeps off the insects. The Dyaks of Borneo ascend the trees by driving strong pegs of bamboo into the trunk, which they connect with an upright bamboo, and thus form a good ladder. The people of Timor literally walk up the trees, by means of a long piece of creeper put round them, and the extremities held in the hand. It is a wonderful sight to see a man ascend thus a vertical trunk 100 feet high, and then creep out upon a horizontal branch and coolly brush away the myriads of bees from a comb a yard in diameter, and become immediately enveloped in a cloud of angry insects, while he cuts off the comb and lets it down to his companions below by a slender cord. In this manner many tons of wax are annually collected, the immature bees and honey supplying a luxurious feast to the bee-hunters.

The genus *Trigona* consists of small stingless bees, which make their nests in holes of trees, consisting of oval irregular cells of black wax. They occur over the whole archipelago; for though they are not in my lists from the Moluccas, that is merely because I neglected to collect them, owing to their being so very common.

In the Tables of the geographical distribution of the species and genera I have arranged the localities in a certain order, and divided them into groups and regions which I believe to be natural. This arrangement is founded chiefly upon the facts presented by the Mammalia and Birds, groups which are in many respects the best adapted to exhibit clearly the phenomena of geographical distribution, since they are not subject to many disturbing influences which powerfully affect the distribution of insects. These come chiefly under two heads—accidental or involuntary transmission, and direct dependence on vegetation and climate. It is evident that Mammalia have scarcely any means of voluntarily passing from island to island over straits of the sea from twenty to fifty miles wide, or even for a much less distance; and they are scarcely likely to be accidentally carried to sea in large numbers, so as to give a chance of a few swimming over to adjacent islands and there establishing themselves. Accordingly we find that the mammalia inhabiting islands, even when very close to another island or continent, indicate very accurately either the recent separation of the two, in which case (as in Great

Britain) every species in the smaller will be found also in the larger tract of land, or a very long disconnexion, in which case (as in that of Madagascar) every species and many genera, and even families, will be peculiar to the smaller island. It would hardly be expected, though it is undoubtedly the fact, that land-birds (with few exceptions) exhibit the same phenomenon in almost an equal degree with mammals, showing that their migrations are comparatively rare and involuntary, except in the case of some preeminently wandering orders and families. These principles can be applied with great facility in the Malay archipelago, which can thus be divided into groups of islands having well-marked mutual relations.

First, we have a great division into two regions, each of which is well characterized by many distinct families of mammals and birds, for some details of which see "Zoological Geography of the Malay Archipelago," in 'Proceedings of Linnean Society,' Zool. vol. iv. p. 172, and 'The Malay Archipelago' (Macmillan and Co., 1869). We thus find that one half of the archipelago belongs to the Indian, the other to the Australian region. In the Indian portion of the archipelago, which may be termed the Indo-Malayan subregion, we find that the islands of Java, Sumatra, and Borneo, together with the Malay peninsula, have the closest resemblance in their natural productions—numbers of species being identical in all, and the same groups, for the most part, occurring throughout; they form therefore one subdivision, which may be called the Indo-Malay islands proper. The Philippine Islands have certain relations to these, but have several distinctive characteristics. They are deficient in several groups which run through all the other islands, and they contain several genera which show a connexion with Celebes in the Australian region, as well as others which indicate a relationship with Chinese Asia.

In the Australian region, New Guinea is the most important and characteristic island, possessing numerous genera of its own; but immediately surrounding it are several islands (Aru, Mysol, Waigiou, &c.) which so closely agree in all important points as to indicate that they form a single district, which may be termed that of the "Papuan Islands." The large group of islands generally known as the Moluccas has a great resemblance to the Papuan group; but several important genera are absent, and the islands possess several common characters: they will form the "Moluccan group." The large island of Celebes is very peculiar,



having, as already pointed out, a decided relationship with the Philippines, and also an apparent direct connexion with New Guinea. It also possesses genera quite peculiar to itself, and has an unusual number of endemic species. The Sula Islands closely agree with it, and are distinctly marked off from the Moluccas, and must therefore form part of the "Celebes group." The islands of Lombock, Sumbawa, Flores, and Timor, with others adjacent, differ much in physical character from the rest of the archipelago, and possess genera and species which indicate a closer connexion with Australia. Their proximity to Java has also led to their being partly populated with species from that island; and they altogether possess a distinctive character which requires them to be considered apart. They form the "Timor group."

Although these groups and regions are exceedingly well marked in Birds and Mammals, and must therefore be taken as the foundation of any scheme of division of the islands according to the distribution of their animal and vegetable productions, yet it is undoubtedly the fact that in the great group of insects these divisions are by no means so clearly marked. Insects have a much more uniform distribution in these countries, as in fact we might expect from the fact that they are much more liable to be accidentally carried from island to island—in their egg- and larva-states by floating trees, trunks, and fruits—in their perfect condition by strong winds and hurricanes; and as the climate and general conditions of the surface vary very little from island to island, such immigrants would, in many cases, survive and lay the foundation of new races. In a paper "On some Anomalies of Zoological and Botanical Geography" (Nat. Hist. Review, Jan. 1864), I have explained my views on this subject at some length.

In the summary of the distribution of the genera of the Aculeate Hymenoptera catalogued by Mr. Smith, I have separated the Apterus Ants from the rest of the order, to see if they would present any difference with regard to their distribution in the two great regions. Out of 39 genera of ants 13, or exactly *one-third*, are common to the two regions. Of the 123 genera of winged Aculeate Hymenoptera, 69 genera, or more than *half*, are common to the two regions. We may reasonably conclude, therefore, that it is the power of flight that has led to this average wider extension of the winged groups. If, instead of comparing the *genera* of the two halves of the archipelago, we compare the



*species* of adjacent islands, we find similar results. For example, of 109 ants found in Borneo and the Malay peninsula, only 12 are common to both, or 11 per cent. ; while of the rest of the Hymenoptera, 198 in number, 33 are common, or near 17 per cent. This fact is important, because we learn from it that *genera* and *species* are distributed in the same manner, the want of the power of flight leading to a more restricted range of both. In the case of *species* this is very intelligible, on the simple principle that the present distribution of animals is the result of natural causes ; but when we find the same law hold for *genera*, it altogether ceases to be intelligible, unless we suppose *species* to undergo modification, so that the *individuals* of a *species* become in time the *species* of a *genus*, in which case their distribution will of course be regulated in a similar manner. The fact therefore that the power of flight affects the distribution of *genera* in the same manner as *species*, is a direct argument in favour of the formation of the one from the other by a natural process of modification.

In order to ascertain if the Hymenoptera show plainly the division of the archipelago into two great regions, I will compare the species of Borneo with those of the Malay peninsula on the one hand, and with those of Celebes on the other. On looking at the map, it will be at once seen that the facilities for passing from Borneo to Celebes are much greater than from Borneo to Malacca : yet, in the former case, out of a total of 479 Hymenoptera collected by me in the two islands, only 27 were found in both, equal to less than *six per cent* ; in the latter case, out of a total of 307 species 45 were common to both, or about *fifteen per cent.*,—plainly indicating that some other cause than the present proximity and facilities for migration has determined the existing distribution, the cause being, as I believe, that Borneo has been recently connected with Malacca, but has never been united to Celebes. The distinctness of the Hymenoptera of the two regions of the archipelago, however, is much greater than is shown by the mere statement of the number of species and genera peculiar to each, since there are many other genera which have a maximum in one region and give a character to its entomology, while, because a few straggling species have passed into the other region, they do not appear as peculiar groups in either. Thus *Crematogaster*, *Atta*, *Catantopus*, *Elis*, *Ammophila*, *Ampulex*, *Tachytes*, *Halictus*, and *Ceratina* are characteristic of the Indian region,

though not confined to it; and, in like manner, *Liacos*, *Prosopis*, *Nomia*, and *Crocisa* have a greater development in the Australian region.

The great inequality of our knowledge of the different islands prevents me from going into more detail as to the facts of their distribution. It must not be supposed, when we see 7 or 10 given as the total of the Hymenoptera from one island, and 216 or 290 from another, that either of these numbers gives any approximation to the sum total of the species inhabiting that island. They merely show what one collector was able to do in each under very different circumstances; and they indicate the points at which future collectors may work with most advantage. The comparatively small number of species yet known from the countries which I have grouped under the term Chinese Asia, from Birmah to China inclusive, and the still more scanty list from the Philippines, show how much there is yet to be done in those countries, even to bring them up to the standard of our still very imperfect knowledge of the Malay archipelago. I would also point out Sumatra, Java, and Timor as islands that would yet well repay an assiduous and persevering entomologist, and which can be visited with much less privation and risk than would be encountered in penetrating to New Guinea and the unknown islands east of it. I would observe, however, that though the individual islands are very unequally known, yet the total number of species obtained from the chief groups of islands, viz. Indo-Malay islands 417, Celebes group 295, Moluccan group 280, Papuan islands 296, indicate a tolerably equal amount of research over the various portions of the archipelago, and render the few results I have deduced from them worthy of some confidence.

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## 2. Catalogue. By F. SMITH.

### Tribe I. Heterogyna, Latr.

#### Fam. FORMICIDÆ, Leach.

##### Gen. FORMICA, Linn.

1. FORMICA CRINITA, Smith, Cat. Hym. Ins. vi. 13. 42, ♀.

*Lasius crinitus*, Mayr, Myrm. Stud., Verh. der k. k. zool.-bot. Gesells. in Wien, 1862, p. 700. 1.

Hab. Northern India.

2. *F. TAPROBANÆ*, *Smith, Cat. Hym. Ins.* vi. 13. 43, ♀.  
*Hab.* Ceylon.
3. *FORMICA COMPRESSA*, *Fabr. Syst. Piez.* p. 396. 2; *Hardw. Zool. Journ.* iv. 114; *St.-Farg. Hym.* i. 214. 17; *Smith, Journ. Proc. Linn. Soc.* ii. 53. 2.  
*Hab.* India; China; Philippines; Borneo; Java; Sumatra; Africa.
4. *F. GIGAS*, *Latr. Hist. Nat. Fourm.* p. 105, pl. 2. f. 2, ♀; *Smith, Proc. Linn. Soc.* ii. 53. 1.  
*Camponotus gigas*, *Mayr, Myrm. Stud.* 669. 29.  
*Hab.* India; Malacca; Borneo; Singapore; Sumatra; Java; China.
5. *F. ASSIMILIS*, *Jerdon, Madr. Journ.* (1851), p. 123; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 42.  
*Hab.* India.
6. *F. CYLINDRICA*, *Fabr. Syst. Piez.* p. 404. 36; *Latr. Hist. Nat. Fourm.* p. 121, pl. 4. fig. 19.  
*Colobopsis cylindrica*, *Mayr, Myrm. Stud.* p. 691.  
*Hab.* India; Mauritius.
7. *F. ABDOMINALIS*, *Latr. Hist. Nat. Fourm.* p. 175, pl. 3. fig. 13.  
*Hab.* India.
8. *F. ELONGATA*, *Fabr. Syst. Piez.* p. 401. 20.  
*Hab.* Tranquebar.
9. *F. CONICA*, *Fabr. Ent. Syst. Supp.* 279. 24.  
*Lasius conicus*, *Fabr. Syst. Piez.* p. 418. 10.  
*Hab.* Tranquebar.
10. *F. NANA*, *Jerdon, Madr. Journ.* (1851), 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 44.  
*Hab.* Tranquebar; Mysore.
11. *F. RUFO-GLAUCA*, *Jerdon, Madr. Journ.* (1851), 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 4.  
*Hab.* India.
12. *F. PHYLLOPHILA*, *Jerdon, Madr. Journ.* (1851), p. 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 43.  
*Hab.* India.
13. *F. CARBONARIA*, *Latr. Hist. Nat. Fourm.* 114, pl. 3. fig. 8, ♀.  
*Hab.* India.
14. *F. STRICTA*, *Jerdon, Madr. Journ.* (1851), 123, ♀; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 105. 37; *Smith, Cat. Hym. Ins.* vi. 16. 57.  
*Colobopsis striatus*, *Mayr, Myrm. Stud.* p. 691.  
*Hab.* India; Borneo; Malabar.
15. *F. VAGANS*, *Jerdon, Madr. Journ.* (1851), 124, ♀, ♂; *Ann. & Mag. Nat. Hist.* 2nd ser. 107. 41.  
*Hab.* India (the Carnatic).

16. *FORMICA VELOX*, *Jerdon, Madr. Journ.* (1851), 124; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 106. 39.  
*Hab.* India; Malabar.
17. *F. ARDENS*, *Smith, Cat. Hym. Ins.* vi. 17. 62, ♀.  
*Hab.* India (Deccan).
18. *F. IMPETUOSA*, *Smith, Cat. Hym. Ins.* vi. 18. 63, ♀.  
*Hab.* India (Bombay).
19. *F. CALLIDA*, *Smith, Cat. Hym. Ins.* vi. 18. 64, ♀.  
*Hab.* India (Deccan).
20. *F. LUTEA*, *Smith, Cat. Hym. Ins.* vi. 19. 65, ♀.  
*Hab.* Northern India.
21. *F. GIBBOSA*, *Smith, Cat. Hym. Ins.* vi. p. 2, fig. 2.  
*Hab.* India.
22. *F. LONGIPES*, *Jerdon, Madr. Journ.* (1851), 122; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 105. 35.  
*Hab.* India; Malacca.
23. *F. VARIEGATA*, *Smith, Cat. Hym. Ins.* vi. 19. 68.  
*Camponotus variegatus*, *Mayr, Myrm. Stud., Verhand. d. k. k. zool.-botan. Gesells. in Wien*, 1862, p. 656. 4.  
*Hab.* Ceylon; Singapore; Syria.
24. *F. MITIS*, *Smith, Cat. Hym. Ins.* vi. 20. 69, ♀.  
*Hab.* Ceylon.
25. *F. VENTRALIS*, *Smith, Cat. Hym. Ins.* iv. 20. 70, ♀.  
*Hab.* Ceylon.
26. *F. BACCHUS*, *Smith, Cat. Hym. Ins.* vi. 21. 71, ♀.  
*Hab.* Ceylon.
27. *F. OBLONGA*, *Smith, Cat. Hym. Ins.* vi. 21. 72, ♀.  
*Hab.* Birmah.
28. *F. TINCTA*, *Smith, Cat. Hym. Ins.* vi. 21. 73, ♀.  
*Camponotus tinctus*, *Mayr, Myrm. Stud.* 676.  
*Hab.* Birmah.
29. *F. IRRITANS*, *Smith, Cat. Hym. Ins.* vi. 22. 75, ♀; *Proc. Linn. Soc.* ii. 55. 11.  
*Hab.* Malacca; Borneo.
30. *F. DILIGENS*, *Smith, Cat. Hym. Ins.* vi. 22. 74, ♀; *Proc. Linn. Soc.* ii. 55. 10.  
*Hab.* Malacca.
31. *F. BADIA*, *Smith, Cat. Hym. Ins.* vi. 22. 76, ♀; *Proc. Linn. Soc.* ii. 54. 9.  
*Hab.* Singapore; Borneo.

32. *FORMICA GRACILIPES*, *Smith, Cat. Hym. Ins.* vi. 22. 77; *Proc. Linn. Soc.* ii. 55. 13.  
*Hab.* Singapore; Celebes; Aru.
33. *F. ARROGANS*, *Smith, Cat. Hym. Ins.* vi. 23. 78, ♂.  
*Hab.* Singapore.
34. *F. CAMELINA*, *Smith, Cat. Hym. Ins.* vi. 23. 79, ♂; *Proc. Linn. Soc.* vi. 57. 18.  
*Hab.* Singapore; Sumatra.
35. *F. FESTINA*, *Smith, Cat. Hym. Ins.* vi. 23. 80, ♀.  
*Hab.* Borneo; Java; China; Sumatra.
36. *F. MISTURA*, *Smith, Cat. Hym. Ins.* vi. 24. 81, ♀; *Proc. Linn. Soc.* ii. 53. 5.  
*Hab.* Borneo.
37. *F. PILOSA*, *Smith, Cat. Hym. Ins.* vi. 24. 82, ♂; *Proc. Linn. Soc.* ii. 54. 7.  
*Colobopsis pilosa*, *Mayr, Myrm. Stud.* 691.  
*Hab.* Borneo.
38. *F. DISTINGUENDA*, *Smith.*  
*F. ruficeps*, *Smith, Cat. Hym. Ins.* vi. 24. 83, ♀; *Proc. Linn. Soc.* ii. 548 (nec *Fabr.*).  
*Hab.* Borneo.
39. *F. FERVENS*, *Smith, Cat. Hym. Ins.* vi. 24. 84, ♂; *Proc. Linn. Soc.* ii. 55. 12.  
*Hab.* Borneo.
40. *F. IRRITABILIS*, *Smith, Cat. Hym. Ins.* vi. 25. 85, ♂; *Proc. Linn. Soc.* ii. 56. 14.  
*Hab.* Borneo; Malacca.
41. *F. SEDULA*, *Smith, Cat. Hym. Ins.* vi. 25. 86, ♂; *Proc. Linn. Soc.* ii. 65. 15.  
*Hab.* Borneo.
42. *F. EXASPERATA*, *Smith, Cat. Hym. Ins.* vi. 25. 87, ♂; *Proc. Linn. Soc.* ii. 54. 16.  
*Camponotus exasperatus*, *Mayr, Myrm. Stud.* 659.  
*Hab.* Borneo.
43. *F. TENUIPES*, *Smith, Cat. Hym. Ins.* vi. 26. 88, ♀; *Proc. Linn. Soc.* ii. 57. 17.  
*Hab.* Borneo.
44. *F. PALLIDA*, *Smith, Cat. Hym. Ins.* vi. 26. 89, ♂; *Proc. Linn. Soc.* ii. 57. 19.  
*Camponotus pallidus*, *Mayr, Myrm. Stud.* 656. 3.  
*Hab.* Borneo.



45. *FORMICA VIGILANS*, *Smith, Cat. Hym. Ins.* vi. 26. 90, ♂.  
*Hab.* Borneo.
46. *F. TRIFASCIATA*, *Smith, Cat. Hym. Ins.* vi. 27. 92, ♀.  
*Hab.* Java.
47. *F. SINGULARIS*, *Smith, Cat. Hym. Ins.* vi. 27. 93, ♀.  
*Hab.* Java.
48. *F. PLACIDA*, *Smith, Cat. Hym. Ins.* vi. 27. 91, ♀.  
*Hab.* Java.
49. *F. LUCTUOSA*, *Smith, Cat. Hym. Ins.* vi. 27. 94, ♀.  
*Hab.* Sumatra.
50. *F. QUADRISECTA*, *Smith, Cat. Hym. Ins.* vi. 28. 95, ♀.  
*Hab.* Philippine Islands.
51. *F. (CAMPONOTUS) REDTENBACHERI*, *Mayr, Myrm. Stud.* 19.  
25, ♂.  
*Hab.* Ceylon.
52. *F. (CAMPONOTUS) PRISMATICA*, *Mayr, Myrm. Stud.* 21. 30, ♂.  
*Hab.* India; Borneo.
53. *F. (CAMPONOTUS) SENILIS*, *Mayr, Myrm. Stud.* 675. 38, ♂.  
*Hab.* Borneo.
54. *F. (CAMPONOTUS) SERICEA*, *Mayr, Myrm. Stud.* 675. 38, ♂.  
*Hab.* Mauritius; India; Ceylon; Egypt.
55. *F. (CAMPONOTUS) AUROSA*, *Roger, Berl. Ent. Zeitschr.* (1863),  
p. 134. 2, ♂.  
*Hab.* Mauritius.
56. *F. (CAMPONOTUS) QUADRILATERA*, *Roger, Berl. Ent. Zeitschr.*  
(1863), p. 136. 6, ♂.  
*Hab.* Coromandel; Pondichery.
57. *F. (CAMPONOTUS) SESQUIPEDALIS*, *Roger, Berl. Ent. Zeitschr.*  
(1863), p. 137. 7, ♂.  
*Hab.* Ceylon.
58. *F. (CAMPONOTUS) AGNATA*, *Roger, Berl. Ent. Zeitschr.* (1865),  
p. 137. 8, ♂.  
*Hab.* Ceylon.
59. *F. (CAMPONOTUS) BARBATA*, *Roger, Berl. Ent. Zeitschr.* (1863),  
p. 138. 9, ♂.  
*Hab.* Ceylon.
60. *F. (CAMPONOTUS) VARIANS*, *Roger, Berl. Ent. Zeitschr.* (1863),  
p. 138. 10, ♂.  
*Hab.* Ceylon.

61. FORMICA (CAMPONOTUS) RETICULATA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 139. 11, ♂.  
*Hab.* Ceylon.
62. F. (CAMPONOTUS) PLATYPUS, *Rogers, Berl. Ent. Zeitschr.* (1863), p. 140. 12, ♀.  
*Hab.* Philippine Islands.
63. F. (COLOBOPSIS) CORALLINA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 159. 39, ♂.  
*Hab.* Philippine Islands.
64. F. ANCEPS, *Roger, Berl. Ent. Zeitschr.* (1863), p. 164. 50, ♀.  
*Hab.* Malacca.
65. F. FRAGILIS, *Smith, Proc. Linn. Soc.* iii. 136. 3, ♂.  
*Hab.* Aru; Waigiou.
66. F. FLAVITARSUS, *Smith, Proc. Linn. Soc.* iii. 136. 4, ♀.  
*Hab.* Aru.
67. F. COXALIS, *Smith, Proc. Linn. Soc.* iii. 136. 5, ♀.  
*Hab.* Aru; Waigiou; Mysol; New Guinea.
68. F. CORDATA, *Smith, Proc. Linn. Soc.* iii. 137. 6, ♀.  
*Hab.* Aru.
69. F. OCLATA, *Smith, Proc. Linn. Soc.* iii. 137. 7, ♀.  
*Hab.* Aru.
70. F. MUTILATA, *Smith, Proc. Linn. Soc.* iii. 137. 8, ♀.  
*Colobopsis mutilata*, *Mayr, Myrm. Stud., Verhand. d. k. k. zool.-botan. Gesells. in Wien.* 1862, p. 691.  
*Hab.* Aru.
71. F. QUADRICEPS, *Smith, Proc. Linn. Soc.* iii. 137. 9, ♀.  
*Colobopsis quadriceps*, *Mayr, Myrm. Stud.* 692. 2.  
*Hab.* Aru; Ceram; New Guinea.
72. F. LÆVISSIMA, *Smith, Proc. Linn. Soc.* iii. 138. 10, ♀.  
*Hab.* Aru; Batchian.
73. F. NITIDA, *Smith, Proc. Linn. Soc.* iii. 138. 11, ♀.  
*Hab.* Aru; Mysol.
74. F. SCRUTATOR, *Smith, Proc. Linn. Soc.* iii. 138. 12, ♀.  
*Hab.* Aru.
75. F. ANGULATA, *Smith, Proc. Linn. Soc.* iii. 139. 13, ♀.  
*Hab.* Aru.
76. F. FAMILIARIS, *Smith, Proc. Linn. Soc.* v. 68. 4, ♀.  
*Hab.* Celebes; Aru.
77. F. SUBTILIS, *Smith, Proc. Linn. Soc.* v. 94. 3, ♀.  
*Hab.* Bachian; Aru.

78. *F. FORMICA VITREA*, *Smith, Proc. Linn. Soc.* v. 94. 4, ♂.  
*Hab.* Bachian.

79. *F. CRUDA*, *Smith, Proc. Linn. Soc.* v. 95. 5, ♂.  
*Hab.* Bachian.

80. *F. LACTARIA*, *Smith, Proc. Linn. Soc.* v. 95. 6, ♂.  
*Hab.* Bachian; Gilolo.

81. *F. INCURSOR*, *Smith, Proc. Linn. Soc.* v. 95. 7, ♂.  
*Hab.* Bachian.

82. *F. RUFIFRONS*, *Smith, Proc. Linn. Soc.* v. 95. 8.  
*Colobopsis rufifrons*, *Mayr, Myrm. Stud.* 691.  
*Hab.* Bachian.

83. *F. PAVIDA*, *Smith, Proc. Linn. Soc.* v. 96. 9, ♀.  
*Hab.* Bachian; Mysol.

84. *F. DOMESTICA*.  
*Formica familiaris*, *Smith, Proc. Linn. Soc.* v. 96. 10.  
*Hab.* Bachian.

85. *F. DORYCUS*, *Smith, Proc. Linn. Soc.* v. 96. 11, ♂.  
*Hab.* New Guinea.

86. *F. DESECTA*, *Smith, Proc. Linn. Soc.* v. 97. 12, ♀.  
*Hab.* New Guinea.

87. *F. CONSANGUINEA*, *Smith, Proc. Linn. Soc.* vi. 36. 3, ♂.  
*Hab.* Celebes.

88. *F. CIRCUMSPECTA*, *Smith, Proc. Linn. Soc.* vi. 37. 4, ♀, ♂.  
*Hab.* Celebes; Waigiou.

89. *F. LEUCOPHÆA*, *Smith, Proc. Linn. Soc.* vi. 7. 35, ♂.  
*Hab.* Celebes.

90. *F. TROPICA*, *Smith, Proc. Linn. Soc.* vi. 7. 36, ♂.  
*Hab.* Gilolo.

91. *F. VIRULENS*, *Smith, Proc. Linn. Soc.* vi. 38. 7, ♂.  
*Hab.* Celebes.

92. *F. LONGICEPS*, *Smith, Proc. Linn. Soc.* vii. 13. 9, ♂.  
*Hab.* Waigiou.

93. *F. AFFINIS*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 314. 8, ♀.  
*Hab.* Borneo.

94. *F. ARCUATA*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 315. 10, ♂.  
*Hab.* Borneo.

95. *F. RUGINOSA*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 316. 11, ♂.  
*Hab.* Borneo.

96. FORMICA PYRRHOCEPHALA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863), 11, ♀.

*Hab.* Ceylon.

97. F. FUSCICAUDA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* 12, ♀.

*Hab.* Ceylon.

98. F. SUBPICEA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* 12.

*Hab.* Ceylon.

99. F. LATEBROSA, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 371, ♂.

*Hab.* Ceylon.

100. F. PUNGENS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 371, ♂.

*Hab.* Ceylon.

101. F. INGRUENS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ♀.

*Hab.* Ceylon.

102. F. DIFFIDENS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ♀.

*Hab.* Ceylon.

103. F. OBSCURANS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ♀.

*Hab.* Ceylon.

104. F. INDEFLEXA, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 373, ♀.

*Hab.* Ceylon.

105. F. CONSULTANS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 373, ♂.

*Hab.* Ceylon.

#### Gen. PARATRECHINA, *Motsch.*

1. PARATRECHINA VAGABUNDA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863), 13, ♀.

*Hab.* Ceylon (the mountains of Patannas).

#### Gen. TAPINOMA, *Foerst.*

1. TAPINOMA GLABRATA, *Smith, Proc. Linn. Soc.* ii. 58. 1, ♀.

*Hab.* Malacca.

2. T. THORACICA, *Smith, Proc. Linn. Soc.* v. 69. 1, ♀.

*Hab.* Celebes.

3. T. NITIDA, *Smith, Proc. Linn. Soc.* v. 69. 2, ♀.

*Hab.* Celebes.

4. T. PRATENSIS, *Smith, Proc. Linn. Soc.* v. 97. 1, ♀.

*Hab.* Bachian.

5. T. GIBBA, *Smith, Proc. Linn. Soc.* vi. 38. 8, ♀.

*Hab.* Celebes.

6. *TAPINOMA ALBIPES*, *Smith, Proc. Linn. Soc.* vi. 38. 9, ♀.  
*Hab.* Celebes.

7. *T. ALBITARSE*, *Motsch. Bull. Imp. des Nat. Mosc.* 14, ♀.  
*Hab.* Ceylon (Colombo).

#### Gen. HYPOCLINEA, *Mayr*.

1. *HYPOCLINEA BITUBERCULATA*, *Mayr, Myrm. Stud.* p. 705. 2, ♀.  
*Hab.* Philippines.

2. *H. GRACILIS*, *Motsch. Bull. Imp. Soc. des Nat. Mosc.* 14, ♀.  
*Hab.* Ceylon (Colombo).

#### Gen. POLYRHACHIS, *Smith*.

1. *POLYRHACHIS (FORMICA) BIHAMATUS*, *Drury, Ins.* ii. pl. 38. fig. 7, ♀; *Fabr. Syst. Piez.* p. 411. 66; *Oliv. Encycl. Meth.* vi. 499; *Latr. Hist. Nat. Fourm.* p. 127; *Smith, Cat. Hym. Ins.* vi. 58. 1; *Proc. Linn. Soc.* ii. 58, 59; *Mayr, Myrm. Stud.* 677. 1.  
*Hab.* India; Sumatra; Borneo; Waigiou; Bachian; Celebes; Ceram.

2. *P. HASTATUS*, *Latr. Hist. Nat. Fourm.* p. 129, pl. iv. fig. 23, ♀; *St.-Farg. Hym.* i. 221. 29; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109.  
*Hab.* India.

3. *P. SEXSPINOSUS*, *Latr. Hist. Nat. Fourm.* p. 126, pl. iv. fig. 21, ♀; *St.-Farg. Hym.* i. 219. 26; *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 313. 4; *Guér. Voy. Coq. Zool.* ii. 204, pl. 8. fig. 3; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109; *Smith, Cat. Hym. Ins.* vi. 59. 3; *Proc. Linn. Soc.* iv. 139. 2.  
*Hab.* India; Philippine Islands; Triton Bay.

4. *P. (FORMICA) RELUCENS*, *Latr. Hist. Nat. Fourm.* p. 131; *St.-Farg. Hym.* i. 220. 27; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109. *Smith, Proc. Linn. Soc.* ii. 59. 2; *Mayr, Myrm. Stud.* 685. 17.  
*Hab.* India; Borneo; Ceylon; Java.

5. *P. RASTELLATUS*, *Latr. Hist. Nat. Fourm.* p. 130. ♀.  
*Hab.* India.

6. *P. NIDIFICANS*, *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 45.  
*Hab.* India (Malabar).

7. *P. SYLVICOLA*, *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 46.  
*Hab.* India.

8. *P. LACTEIPENNIS*, *Smith, Cat. Hym. Ins.* vi. 34. 115, ♀.  
*Hab.* Northern India.



9. *POLYRHACHIS PILIVENTRIS*, *Smith, Cat. Hym. Ins.* vi. 60. 9, ♀.  
*Hab.* Singapore.
10. *P. DIVES*, *Smith, Cat. Hym. Ins.* vi. 60. 10, ♀; *Proc. Linn. Soc.* ii. 64. 19.  
*Hab.* Singapore; Malacca; Waigiou; Ceram; Bachian.
11. *P. FLAVICORNIS*, *Smith, Cat. Hym. Ins.* vi. 60. 11, ♀; *Proc. Linn. Soc.* ii. 63. 17.  
*Hab.* Singapore; Malacca; Borneo.
12. *P. HECTOR*, *Smith, Proc. Linn. Soc.* ii. 62. 14, ♀; *Cat. Hym. Ins.* vi. 61. 12.  
*Hab.* Singapore.
13. *P. MODESTUS*, *Smith, Proc. Linn. Soc.* ii. 62. 12; *Cat. Hym. Ins.* vi. 61. 13, ♀.  
*Hab.* Singapore.
14. *P. CHALYBEUS*, *Smith, Proc. Linn. Soc.* ii. 61. 9; *Cat. Hym. Ins.* xii. 61. 14, ♀.  
*Hab.* Singapore; Malacca.
15. *P. PANDARUS*, *Smith, Proc. Linn. Soc.* ii. 62. 13; *Cat. Hym. Ins.* vi. 65. 27, ♀.  
*P. defensus*, *Smith, Proc. Linn. Soc.* ii. 59. 4; *Cat. Hym. Ins.* vi. 62. 15.  
*Hab.* Singapore; Java; Philippines; Borneo.
16. *P. LÆVIGATUS*, *Smith, Proc. Linn. Soc.* ii. 62. 15; *Cat. Hym. Ins.* vi. 62. 16, ♀.  
*Hab.* Malacca; Borneo.
17. *P. TEXTOR*, *Smith, Proc. Linn. Soc.* ii. 60. 8; *Cat. Hym. Ins.* vi. 62. 17, pl. i. fig. 1, ♀.  
*Hab.* Malacca.
18. *P. CARBONARIUS*, *Smith, Proc. Linn. Soc.* ii. 60. 7; *Cat. Hym. Ins.* vi. 62. 18, ♀.  
*Hab.* Malacca.
19. *P. AFFINIS*, *Smith, Cat. Hym. Ins.* vi. 63. 19, ♀.  
*Hab.* Burmah.
20. *P. ABDOMINALIS*, *Smith, Cat. Hym. Ins.* vi. 63. 20, ♀.  
*Hab.* Burmah.
21. *P. TIBIALIS*, *Smith, Cat. Hym. Ins.* vi. 63. 21, ♀.  
*Hab.* Burmah.
22. *P. MUTATUS*, *Smith, Cat. Hym. Ins.* vi. 64. 22, ♀, pl. iv. figs. 12, 13.  
*Hab.* Burmah.

23. *POLYRHACHIS LÆVISSIMUS*, *Smith, Cat. Hym. Ins.* vi. 64. 23, ♂.  
*Hab.* Burmah.
24. *P. FURCATUS*, *Smith, Cat. Hym. Ins.* vi. 64. 24, ♀, pl. 4, f. 20.  
*Hab.* Burmah.
25. *P. BICOLOR*, *Smith, Cat. Hym. Ins.* vi. 65. 25, ♀.  
*Hab.* Burmah.
26. *P. SUMATRENSIS*, *Smith, Cat. Hym. Ins.* vi. 65. 26, pl. 4. fig. 43.  
*Hab.* Sumatra.
27. *P. CUSPIDATUS*, *Smith, Cat. Hym. Ins.* vi. 66. 28, ♂; *Proc. Linn. Soc.* ii. 63. 14.  
*Hab.* Borneo.
28. *P. EQUINUS*, *Smith, Cat. Hym. Ins.* vi. 66. 29, ♂; *Proc. Linn. Soc.* ii. 63. 16.  
*Hab.* Borneo.
29. *P. VINDEX*, *Smith, Cat. Hym. Ins.* vi. 66. 30, ♂; *Proc. Linn. Soc.* ii. 64. 20.  
*Hab.* Borneo.
30. *P. RUFIPES*, *Smith, Cat. Hym. Ins.* vi. 66. 31, ♀, pl. 4. fig. 28.  
*Hab.* Borneo.
31. *P. CASTANEIVENTRIS*, *Smith, Cat. Hym. Ins.* vi. 67. 32, ♀.  
*Hab.* Borneo.
32. *P. VILLIPES*, *Smith, Cat. Hym. Ins.* vi. 67. 33, ♂, pl. 4. figs. 37, 38; *Proc. Linn. Soc.* ii. 61. 11.  
*Hab.* Borneo.
33. *P. NITIDUS*, *Smith, Cat. Hym. Ins.* vi. 67. 34; *Proc. Linn. Soc.* ii. 61. 10.  
*Hab.* Borneo.
34. *P. RUFICORNIS*, *Smith, Cat. Hym. Ins.* vi. 68. 35, ♀; *Journ. Proc. Linn. Soc.* ii. 60. 6.  
*Hab.* Borneo.
35. *P. CONSTRUCTOR*, *Smith, Cat. Hym. Ins.* vi. 68. 36, ♀; *Proc. Linn. Soc.* ii. 60. 5.  
*Hab.* Borneo.
36. *P. INERMIS*, *Smith, Cat. Hym. Ins.* vi. 68. 37, ♂, pl. 4. f. 25, 26.  
*Hab.* Celebes.
37. *P. RIXOSUS*, *Smith, Cat. Hym. Ins.* vi. 68. 38, ♀, pl. 4. fig. 27.  
*Hab.* Celebes.
38. *P. PHILIPPINENSIS*, *Smith, Cat. Hym. Ins.* vi. 69. 41, ♂.  
*Hab.* Philippines.

39. *POLYRHACHIS MALIGNUS*, *Smith, Cat. Hym. Ins.* vi. 70. 42, pl. 4. fig. 44.  
*Hab.* Philippines.
40. *P. CYANIVENTRIS*, *Smith, Cat. Hym. Ins.* vi. 70. 43, ♀, pl. 4. fig. 47.  
*Hab.* Philippines.
41. *P. ACICULATUS*, *Smith, Cat. Hym. Ins.* vi. 70. 44, ♂, pl. 4. figs. 17, 18.  
*Hab.* Philippines.
42. *P. CARINATUS*, *Fabr. Syst. Piez.* p. 413. 71; *St.-Farg.* i. 220. 28; *Jerdon, Madr. Journ.* 1851, 126; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109.  
*Hab.* Malacca; Singapore.
43. *P. SERICATUS*, *Guér. Voy. Coq.* ii. 203, Atlas, pl. 8. figs. 2, 2 a, b, c, d; *Smith, Append. Cat. Hym. Ins.* vi. 200; *Proc. Linn. Soc.* iii. 139. 1.  
*Hab.* Bachian; Martabello; Bouru; Kéy; Aru; New Hebrides.
44. *P. MARGINATUS*, *Smith, Proc. Linn. Soc.* iii. 139. 3, ♂.  
*Hab.* Aru; India; Philippines; Waigiou; Bachian.
45. *P. HOSTILIS*, *Smith, Proc. Linn. Soc.* iii. 139. 4, ♂.  
*Hab.* Aru.
46. *P. LONGIPES*, *Smith, Proc. Linn. Soc.* iii. 140. 5, ♂.  
*Hab.* Aru.
47. *P. SERRATUS*, *Smith, Proc. Linn. Soc.* iii. 140. 6, ♂.  
*Hab.* Aru; Waigiou.
48. *P. SCUTULATUS*, *Smith, Proc. Linn. Soc.* iii. 140. 7, ♂.  
*Hab.* Aru; Ceram.
49. *P. MUCRONATUS*, *Smith, Proc. Linn. Soc.* iii. 140. 8, ♂.  
*Hab.* Aru.
50. *P. GEOMETRICUS*, *Smith, Proc. Linn. Soc.* iii. 141. 9, ♂.  
*Hab.* Aru.
51. *P. IRRITABILIS*, *Smith, Proc. Linn. Soc.* iii. 141. 10, ♂ (sexspinosus ♀?).  
*Hab.* Aru.
52. *P. LÆVISSIMUS*, *Smith, Proc. Linn. Soc.* iii. 141. 11, ♂.  
*Hab.* Aru.
53. *P. BELLICOSUS*, *Smith, Proc. Linn. Soc.* iii. 142. 12, ♂.  
*Hab.* Aru.
54. *P. HECTOR*, *Smith, Proc. Linn. Soc.* iii. 142. 13, ♂.  
*Hab.* Aru.

55. *POLYRHACHIS RUFOFEMORATUS*, *Smith, Proc. Linn. Soc.* iii. 142.  
14, ♂.  
*Hab.* Aru ; Ternate ; Ceram.
56. *P. PHYLLOPHILUS*, *Smith, Proc. Linn. Soc.* v. 69. 1, ♂.  
*Hab.* Celebes.
57. *P. COMPRESSICORNIS*, *Smith, Proc. Linn. Soc.* v. 69. 2, ♀.  
*Hab.* Celebes.
58. *P. RUGIFRONS*, *Smith, Proc. Linn. Soc.* v. 70. 3, ♀.  
*Hab.* Celebes ; Mysol.
59. *P. SCULPTURATUS*, *Smith, Proc. Linn. Soc.* v. 70. 4, ♀ ♂.  
*Hab.* Celebes ; Timor.
60. *P. NUDATUS*, *Smith, Proc. Linn. Soc.* v. 71. 5, ♂.  
*Hab.* Celebes.
61. *P. PEREGRINUS*, *Smith, Proc. Linn. Soc.* v. 71. 6, ♀.  
*Hab.* Celebes.
62. *P. VESTITUS*, *Smith, Proc. Linn. Soc.* v. 71. 7, ♂.  
*Hab.* Celebes.
63. *P. SÆVISSIMUS*, *Smith, Proc. Linn. Soc.* v. 71. 8, ♂.  
*Hab.* Celebes.
64. *P. ORSYLLUS*, *Smith, Proc. Linn. Soc.* vi. 39. 8, ♂, pl. 1. fig. 6.  
*Hab.* Celebes ; Ceram.
65. *P. MUTILIÆ*, *Smith, Proc. Linn. Soc.* vi. 39. 9, ♂, pl. 1. fig. 7.  
*Hab.* Celebes.
66. *P. OLENUS*, *Smith, Proc. Linn. Soc.* vi. 39. 10, ♂, pl. 1. fig. 8.  
*Hab.* Celebes.
67. *P. DEMOCLES*, *Smith, Proc. Linn. Soc.* vi. 40. 11, ♀, pl. 1.  
fig. 9.  
*Hab.* Celebes.
68. *P. VALERUS*, *Smith, Proc. Linn. Soc.* vi. 40. 12, ♂, pl. 1. fig. 10.  
*Hab.* Celebes.
69. *P. TRISPINOSUS*, *Smith, Proc. Linn. Soc.* vi. 40. 13, ♀, pl. 1.  
fig. 11.  
*Hab.* Celebes.
70. *P. DIAPHANTUS*, *Smith, Proc. Linn. Soc.* vi. 40. 14, ♂, pl. 1.  
fig. 12.  
*Hab.* Celebes ; Ceram.
71. *P. AMANUS*, *Smith, Proc. Linn. Soc.* vi. 41. 15, ♂, pl. 1. fig. 13.  
*Hab.* Celebes.

72. POLYRHACHIS CLEOPHANES, *Smith, Proc. Linn. Soc.* vi. 41. 16, ♂, pl. 1. fig. 14.  
*Hab.* Celebes.
73. P. EXASPERATUS, *Smith, Proc. Linn. Soc.* vi. 41. 17, ♀, pl. 1. figs. 15, 16.  
*Hab.* Celebes.
74. P. VIBIDIA, *Smith, Proc. Linn. Soc.* vi. 42. 18, ♀, pl. 1. fig. 17.  
*Hab.* Celebes.
75. P. NUMERIA, *Smith, Proc. Linn. Soc.* vi. 42. 20, ♀, pl. 1. fig. 19.  
*Hab.* Celebes.
76. P. HIPPOMANES, *Smith, Proc. Linn. Soc.* vi. 43. 21, ♀, pl. 1. fig. 20.  
*Hab.* Celebes.
77. P. LYCIDAS *Smith, Proc. Linn. Soc.* vi. 43. 22, ♀, pl. 1. fig. 21.  
*Hab.* Celebes.
78. P. ZOPYRUS, *Smith, Proc. Linn. Soc.* vi. 43. 23, ♂, pl. 1. fig. 22.  
*Hab.* Celebes.
79. P. EURYTUS, *Smith, Proc. Linn. Soc.* vi. 43. 24, ♀, pl. 1. fig. 23.  
*Hab.* Celebes.
80. P. CHAONIA, *Smith, Proc. Linn. Soc.* vi. 42. 19, ♀, pl. 1. fig. 18.  
*Hab.* Gilolo.
81. P. CHARAXUS, *Smith, Proc. Linn. Soc.* v. 98. 6, ♂, pl. 1. fig. 14.  
*Hab.* Bachian.
82. P. BUSIRIS, *Smith, Proc. Linn. Soc.* v. 98. 7, ♀, pl. 1. fig. 15.  
*Hab.* Bachian; Dorey.
83. P. ACANTHA, *Smith, Proc. Linn. Soc.* v. 98. 8, ♀, pl. 1. fig. 16.  
*Hab.* Bachian.
84. P. MEROPS, *Smith, Proc. Linn. Soc.* v. 98. 9, ♂.  
*Hab.* Bachian.
85. P. ITHONUS, *Smith, Proc. Linn. Soc.* v. 99. 10, ♀.  
*Hab.* Bachian.
86. P. EUDORA, *Smith, Proc. Linn. Soc.* v. 99. 11, ♀.  
*Hab.* Bachian.
87. P. METELLA, *Smith, Proc. Linn. Soc.* v. 99. 12, ♂.  
*Hab.* Dory.
88. P. ATROPOS, *Smith, Proc. Linn. Soc.* v. 100. 13, ♀.  
*Hab.* Dory.



89. *POLYRHACHIS ACASTA*, *Smith, Proc. Linn. Soc.* v. 100. 14, ♂.  
*Hab.* Bachian.
90. *P. ALPHENUS*, *Smith, Proc. Linn. Soc.* v. 100. 15, ♂.  
*Hab.* Bachian.
91. *P. LABELLA*, *Smith, Proc. Linn. Soc.* v. 100. 16, ♂.  
*Hab.* Bachian.
92. *P. FERVENS*, *Smith, Proc. Linn. Soc.* v. 110. 17, ♂.  
*Hab.* Amboyna.
93. *P. DOLOMEDES*, *Smith, Proc. Linn. Soc.* vii. 14. 17, ♀, ♂.  
*Hab.* Ceram.
94. *P. TROPHIMUS*, *Smith, Proc. Linn. Soc.* vii. 14. 18, ♂.  
*Hab.* Ceram.
95. *P. ALPHEUS*, *Smith, Proc. Linn. Soc.* vii. 14. 19, ♂.  
*Hab.* Waigiou.
96. *P. BUBASTES*, *Smith, Proc. Linn. Soc.* vii. 15. 20, ♀.  
*Hab.* Waigiou.
97. *P. PAROMALUS*, *Smith, Proc. Linn. Soc.* vii. 15. 21, ♂.  
*Hab.* Ceram.
98. *P. XIPHIAS*, *Smith, Proc. Linn. Soc.* vii. 16. 22, ♀.  
*Hab.* Waigiou.
99. *P. EURYALUS*, *Smith, Proc. Linn. Soc.* vii. 16. 23, ♂.  
*Hab.* Mysol.
100. *P. DEREYNUS*, *Smith, Proc. Linn. Soc.* vii. 16. 24, ♂.  
*Hab.* Waigiou.
101. *P. SPARAXES*, *Smith, Proc. Linn. Soc.* vii. 16. 25, ♀.  
*Hab.* Mysol.
102. *P. NIGRICEPS*, *Smith, Proc. Linn. Soc.* vii. 17. 26, ♂.  
*Hab.* Waigiou.
103. *P. PAXILLUS*, *Smith, Proc. Linn. Soc.* vii. 17. 27, ♂.  
*Hab.* Martabello.
104. *P. NEPTUNUS*, *Smith, Proc. Linn. Soc.* viii. 69. 17, ♂.  
*Hab.* New Guinea.
105. *P. THRINAX*, *Roger, Berl. Ent. Zeitschr.* (1863), 152. 29, ♂.  
*Hab.* Ceylon.
106. *P. PUNCTILLATA*, *Roger, Berl. Ent. Zeitschr.* (1863), 152.  
30, ♂.  
*Hab.* Ceylon.

107. *POLYRHACHIS CONVEXA*, Roger, *Berl. Ent. Zeitschr.* (1863), 153.  
31, ♀.  
*Hab.* Ceylon.
108. *P. DECIPIENS*, Roger, *Berl. Ent. Zeitschr.* (1863), 156. 35, ♀.  
*Hab.* Bachian.
109. *P. RUPICAPRA*, Roger, *Berl. Ent. Zeitschr.* (1863), 154. 32, ♀.  
*Hab.* Ceylon.
110. *P. PROXIMA*, Roger, *Berl. Ent. Zeitschr.* (1863), 155, 33, ♀.  
*Hab.* Island of Lingga.
111. *P. LATIFRONS*, Roger, *Berl. Ent. Zeitschr.* (1863), 155.  
34, ♀.  
*Hab.* Island of Bintang.
112. *P. PRESSUS*, Mayr, *Myrm. Stud.* p. 33. 8, ♀.  
*Hab.* Java.
113. *P. ARGENTEUS*, Mayr, *Myrm. Stud.* p. 34. 9, ♀.  
*Hab.* Philippines.
114. *P. CLYPEATUS*, Mayr, *Myrm. Stud.* p. 35. 12, ♀.  
*Hab.* Ceylon.
115. *P. NIGER*, Mayr, *Myrm. Stud.* p. 35. 13, ♀.  
*Hab.* Ceylon.
116. *P. AURICHALCEUS*, Mayr, *Myrm. Stud.* p. 36. 14, ♀.  
*Hab.* Java.
117. *P. CYANEUS*, Mayr, *Myrm. Stud.* p. 36. 16, ♀. (*P. cyani-*  
*ventris*, *Cat. Form.* p. 70, var. ?)  
*Hab.* Java.
118. *P. STRIATUS*, Mayr, *Myrm. Stud.* p. 38. 19, ♀.  
*Hab.* Java.
119. *P. STRIATORUGOSUS*, Mayr, *Myrm. Stud.* p. 38. 20, ♀.  
*Hab.* Birmah, Java.
120. *P. FRAUENFELDI*, Mayr, *Myrm. Stud.* p. 39. 22, ♀.  
*Hab.* Java.
121. *P. (FORMICA) RASTELLATUS*, Latr. *Fourm.* p. 130, ♀; Mayr,  
*Myrm. Stud.* p. 40. 23, ♀.  
*Hab.* India.
122. *P. (FORMICA) ARMATUS*, Le Guillou, *Ann. Soc. Ent. Fr.* (1841),  
313. 5.  
*Hab.* Philippines.

123. POLYRHACHIS MAYRI, *Roger, Berl. Ent. Zeitschr.* (1863), 7. 198.  
*Hab.* Ceylon; Java; Philippines.
124. P. ILLAUDATUS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv.  
 373, ♀.  
*Hab.* Ceylon.
125. P. (FORMICA) EXERCITUS, *Walk. Ann. & Mag. Nat. Hist.* (1859),  
 iv. 370, ♀.  
*Hab.* Ceylon.

Gen. HEMIOPTICA, *Roger.*

1. HEMIOPTICA (POLYRHACHIS?) SCISSA, *Roger, Berl. Ent. Zeitschr.*  
 (1862), 240, Taf. 1. fig. 12, ♀, ♂.  
*Hab.* Ceylon.

Gen. ECHINOPLA, *Smith.*

1. ECHINOPLA MELANARCTOS, *Smith, Proc. Linn. Soc.* ii. 79. 1, ♂;  
*Cat. Hym. Ins. Form.* vi. 197. 1.  
*Hab.* Singapore; Borneo; Sumatra.
2. E. PALLIPES, *Smith, Proc. Linn. Soc.* ii. 80. 2, ♀; *Cat. Hym. Ins.*  
*Form.* vi. 198. 2; *Mayr, Myrm. Stud.* p. 688. 1.  
*Hab.* Borneo; Celebes.
3. E. STRIATA, *Smith, Proc. Linn. Soc.* ii. 80. 3, ♀; *Cat. Hym. Ins.*  
*Form.* vi. 80. 3, ♀; *Mayr, Myrm. Stud.* p. 689. 2, ♀.  
*Hab.* Malacca; Borneo; Sumatra; Celebes; Ceram.
4. E. PRÆTEXTA, *Smith, Proc. Linn. Soc.* v. 113. 1, ♀.  
*Hab.* Bachián.
5. E. DUBITATA, *Smith, Proc. Linn. Soc.* vi. 50. 3, ♀.  
*Hab.* Celebes.
6. E. NITIDA, *Smith, Proc. Linn. Soc.* vii. 23. 2, ♀.  
*Hab.* Ceram.
7. E. LINEATA, *Mayr, Myrm. Stud.* 689. 3, ♀.  
*Hab.* Java.
8. E. SENILIS, *Mayr, Myrm. Stud.* p. 690. 4, ♀.  
*Hab.* Sambelong.
9. E. DECEPTOR, *Smith, Proc. Linn. Soc.* vii. 23. 3, ♀.  
*Hab.* Bouru.

Gen. PLAGIOLEPIS, *Mayr.*

1. PLAGIOLEPIS PISSINA, *Roger, Berl. Ent. Zeitschr.* (1863), 162. 45.  
*Hab.* Ceylon.

Gen. ACROPYGA, *Roger*.

1. ACROPYGA ACUTIVENTRIS, *Roger, Berl. Ent. Zeitschr.* (1862), 243, ♀, ♂.

*Hab.* Ceylon.

Gen. ŒCOPHYLLA, *Smith*.

1. ŒCOPHYLLA (FORMICA) SMARAGDINA, *Fabr. Syst. Piez.* p. 397. 4; *Latr. Fourm.* p. 176, pl. 3. fig. 18; *St.-Farg. Hym.* i. 218. 25; *Jerdon, Mad. Journ.* (1851), 121; *Ann. & Mag. Nat. Hist.* (1854), xiii. 104; *Smith, Proc. Linn. Soc.* v. 102.

*Hab.* India; China; Philippines; Malacca; Borneo; Gilolo; Java; Bachian; Waigiou; Dorey; Mysol; Celebes; Aru; Timor.

Fam. ODONTOMACHIDÆ, *Mayr*.Gen. ODONTOMACHUS, *Latr.*

1. ODONTOMACHUS RIXOSUS, *Smith, Cat. Hym. Ins. Form.* vi. 79. 9, ♂; *Proc. Linn. Soc.* ii. 64. 1.

*Hab.* Singapore; Ternate.

2. O. RUGOSUS, *Smith, Proc. Linn. Soc.* ii. 65. 2.

*Hab.* Singapore.

3. O. SÆVISSIMUS, *Smith, Cat. Hym. Ins. Form.* vi. 80. 12, ♀.

*Hab.* Ceram; Bachian.

4. O. SIMILLIMUS, *Smith, Cat. Hym. Ins. Form.* vi. 80. 11, ♀.

*Hab.* Fidjee Islands; Ceylon; Aru; Celebes; China; Waigiou.

5. O. INFANDUS, *Smith, Cat. Hym. Ins. Form.* vi. 81. 13, ♂.

*Hab.* Philippines.

6. O. NIETNERI, *Roger, Berl. Ent. Zeitschr.* (1860), 23. 78, ♂; (O. simillima, *Smith*, ♂?).

*Hab.* Ceylon.

7. O. TYRANNICUS, *Smith, Proc. Linn. Soc.* iii. 144. 2, ♂.

*Hab.* Aru; Waigiou.

8. O. MALIGNUS, *Smith, Proc. Linn. Soc.* iii. 144. 3, ♂.

*Hab.* Aru; Mysol; Ceram.

9. O. ANIMOSUS, *Smith, Proc. Linn. Soc.* v. 102. 2, ♂.

*Hab.* New Guinea.

10. O. NIGRICEPS, *Smith, Proc. Linn. Soc.* v. 103. 3, ♂.

*Hab.* New Guinea.

11. ODONTOMACHUS GLADIATOR, *Smith, Proc. Linn. Soc.* vi. 44. 3, ♂  
(nec "tyrannicus," *Linn. Proc.* vol. iii. 144. 2).

*Hab.* Mysol; Celebes.

12. O. CEPHALOTES, *Smith, Proc. Linn. Soc.* vii. 19. 5, ♂.

*Hab.* Ceram.

13. O. ACICULATUS, *Smith, Linn. Proc. Soc.* vii. 19. 6, ♂.

*Hab.* Mysol.

Gen. DREPANOGNATHUS, *Smith.*

1. DREPANOGNATHUS (HARPEGNATHOS) SALTATOR, *Jerdon, Madr. Journ.* (1851), 116, and *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 100 (1854); *Smith, Cat. Hym. Ins. Form.* vi. 82. 1.

*Hab.* India.

2. D. VENATOR, *Smith, Cat. Hym. Ins. Form.* vi. 82. 3.

*Hab.* Madras.

Fam. PONERIDÆ, *Smith.*

Gen. PONERA.

1. PONERA SCULPTA, *Jerdon, Madr. Journ.* (1851), 117, and *Ann. & Mag. Nat. Hist.* (1854), xiii. 101; *Smith, Cat. Hym. Ins. Form.* vi. 84. 4.

*Hab.* Malabar.

2. P. STENOICHEILOS, *Jerdon, Madr. Journ.* (1851), 118; *Ann. & Mag. Nat. Hist.* (1854), xiii. 101.

*Hab.* Malabar.

3. P. PROCESSIONALIS, *Jerdon, Madr. Journ.* (1851), 118; *Ann. & Mag. Nat. Hist.* (1854), xiii. 102.

*Hab.* India.

4. P. AFFINIS, *Jerdon, Madr. Journ.* (1851), 118; *Ann. & Mag. Nat. Hist.* (1854), xiii. 102.

*Hab.* Malabar.

5. P. PUMILA, *Jerdon, Madr. Journ.* (1851), 119; *Ann. & Mag. Nat. Hist.* (1854) xiii. 102.

*Hab.* Malabar.

6. P. SCALPRATA, *Smith, Cat. Hym. Ins. Form.* vi. 84. 9, ♀.

*Hab.* Northern India.

7. P. IRIDIPENNIS, *Smith, Cat. Hym. Ins. Form.* vi. 85. 10, ♂.

*Hab.* North Bengal.

8. P. RETICULATA, *Smith, Cat. Hym. Ins. Form.* vi. 85. 11, ♂.

*Hab.* Birmah.

9. P. PALLIDA, *Smith, Cat. Hym. Ins. Form.* vi. 85. 12, ♂.

*Hab.* Birmah.



10. *PONERA RUBRA*, *Smith, Cat. Hym. Ins. Form.* vi. 86. 13, ♀;  
*Journ. Proc. Linn. Soc.* ii. 66. 2.  
*Hab.* Singapore.
11. *P. GEOMETRICA*, *Smith, Cat. Hym. Ins. Form.* vi. 86. 14, ♀;  
*Proc. Linn. Soc.* ii. 67. 8; *Roger, Berl. Ent. Zeitschr.* (1860), 301.  
26.  
*Diacamma geometricum*, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.  
*Hab.* Singapore; Ceylon; Celebes.
12. *P. TRANSVERSA*, *Smith, Cat. Hym. Ins. Form.* vi. 86. 15, ♀; *Proc.*  
*Linn. Soc.* ii. 68. 9.  
*Hab.* Singapore.
13. *P. PALLIPES*, *Smith, Cat. Hym. Ins. Form.* vi. 87. 16, ♂.  
*Hab.* Java.
14. *P. VERSICOLOR*, *Smith, Cat. Hym. Ins. Form.* vi. 87. 17, ♀; *Proc.*  
*Linn. Soc.* ii. 65. 1.  
*P. sculpta*, *Roger, Berl. Ent. Zeitschr.* (1860), p. 300 (nec *Jerdon*).  
*Hab.* Borneo; Philippines.
15. *P. (APICALIS) TERMINALIS*, *Smith, Cat. Hym. Ins. Form.* vi.  
88. 18 (nec "apicalis," *Latr. Fourm.* p. 204).  
*Hab.* Borneo.
16. *P. IRIDESCENS*, *Smith, Cat. Hym. Ins. Fourm.* vi. 88. 19, ♀;  
*Journ. Proc. Proc. Linn. Soc.* ii. 66. 4.  
*Hab.* Borneo.
17. *P. (RUGOSA) COXALIS*, *Smith, Cat. Hym. Ins. Form.* vi. 88. 20;  
*Proc. Linn. Soc.* ii. 66. 5. (nec "rugosa," *Le Guillou*).  
*P. coxalis*, *Roger, Berl. Ent. Zeitschr.* (1860), 308. 43.  
*Hab.* Borneo; Celebes; Aru.
18. *P. RUGOSA*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), p. 318.  
15, ♀.  
*Hab.* Borneo.
19. *P. INTRICATA*, *Smith, Cat. Hym. Ins. Form.* vi. 88. 21, ♀; *Proc.*  
*Linn. Soc.* ii. 67. 7.  
*Hab.* Borneo.
20. *P. VIDUA*, *Smith, Cat. Hym. Ins. Form.* vi. 89. 22, ♂; *Proc. Linn.*  
*Soc.* ii. 68. 10.  
*Hab.* Borneo.
21. *P. DIMINUTA*, *Smith, Cat. Hym. Ins. Form.* vi. 89. 23, ♀; *Proc.*  
*Linn. Soc.* ii. 69. 11.  
*Hab.* Borneo.

22. *PONERA POMPILOIDES*, *Smith, Cat. Hym. Ins. Form.* vi. 90.  
24, ♂; *Proc. Linn. Soc.* ii. 69. 12.  
*Hab.* Borneo.
23. *P. LÆVICEPS*, *Smith, Cat. Hym. Ins. Form.* vi. 90. 25; *Proc. Linn. Soc.* ii. 69. 13.  
*Hab.* Borneo; Waigiou; Bachian; Celebes.
24. *P. OCELLIFERA*, *Roger, Berl. Ent. Zeitschr.* (1860), p. 13. 68, ♀.  
*Hab.* Ceylon.
25. *P. (SYSCIA) TYPHLA*, *Roger, Berl. Ent. Zeitschr.* (1860), p. 20.  
75, ♀.  
*Hab.* Ceylon.
26. *P. (MYOPIAS) AMBLYOPS*, *Roger, Berl. Ent. Zeitschr.* (1860),  
p. 39. 120, ♀.  
*Hab.* Ceylon.
27. *P. (LEPTOGENYS) FALCIGERA*, *Roger, Berl. Ent. Zeitschr.* (1860),  
p. 42. 122, ♀.  
*Hab.* Ceylon.
28. *P. SCULPTURATA*, *Smith, Proc. Linn. Soc.* iii. 142. 2, ♀.  
*Diacamma sculpturatum*, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.  
*Hab.* Aru.
29. *P. PARALLELA*, *Smith, Proc. Linn. Soc.* iii. 143. 3, ♀.  
*Hab.* Aru; Celebes.
30. *P. QUADRIDENTATA*, *Proc. Linn. Soc.* iii. 143. 4, ♀.  
*Hab.* Aru.
31. *P. TRUNCATA*, *Smith, Proc. Linn. Soc.* v. 72. 3, ♀.  
*Hab.* Celebes.
32. *P. UNICOLOR*, *Smith, Proc. Linn. Soc.* v. 73. 4, ♂.  
*Hab.* Celebes.
33. *P. PALLIDICORNIS*, *Smith, Proc. Linn. Soc.* v. 73. 5, ♂.  
*Hab.* Celebes.
34. *P. PALLIDIPENNIS*, *Smith, Proc. Linn. Soc.* v. 73. 6, ♂.  
*Hab.* Celebes.
35. *P. MALIGNA*, *Smith, Proc. Linn. Soc.* vi. 44. 4, ♀.  
*Hab.* Celebes.
36. *P. NITIDA*, *Smith, Proc. Linn. Soc.* vi. 45. 5, ♀.  
*Hab.* Celebes.
37. *P. MUTABILIS*, *Smith, Proc. Linn. Soc.* vi. 45. 6, ♀.  
*Hab.* Celebes.

38. *PONERA PURPUREA*, *Smith, Proc. Linn. Soc.* vii. 18. 4, ♀.  
*Hab.* Gilolo.
39. *P. TORTUOLOSA*, *Smith, Proc. Linn. Soc.* vii. 18. 5, ♀, ♀.  
*Hab.* Ceram; Bouru.
40. *P. FEROX*, *Smith, Proc. Linn. Soc.* viii. 70. 5, ♀.  
*Hab.* Salwatty.
41. *P. SOLITARIA*, *Smith, Proc. Linn. Soc.* v. 103. 2, ♂.  
*Hab.* Bachian.
42. *P. VAGANS*, *Smith, Proc. Linn. Soc.* v. 103. 3, ♀.  
*Diacamma vagans*, *Roger, Berl. Ent. Zeitschr.* (1863), 16.  
*Hab.* Bachian.
43. *P. STRIATA*, *Smith, Proc. Linn. Soc.* v. 104. 4, ♀.  
*Hab.* Bachian.
44. *P. SIMILLIMA*, *Smith, Proc. Linn. Soc.* v. 104. 5, ♀.  
*Hab.* Bachian; New Guinea.
45. *P. CUPREA*, *Smith, Proc. Linn. Soc.* v. 104. 6, ♀.  
*Hab.* Bachian.
46. *P. NOMINATA*, *Smith (simillima), Proc. Linn. Soc.* v. 105. 7.  
*Hab.* Dory.
47. *P. BISPINOSA*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 317.  
14, ♀.  
*Diacamma bispinosum*, *Roger, Berl. Ent. Zeitschr.* (1863), 18.  
*Hab.* Ternate.
48. *P. RUGOSA*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 318. 15, ♀.  
*Diacamma rugosum*, *Mayr, Myrm. Stud.* p. 78. 1.  
*Hab.* Borneo.
49. *P. HOLOSERICA*, *Roger, Berl. Ent. Zeitschr.* (1860), 302. 27, ♀.  
*Diacamma holosericum*, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.  
*Hab.* Java.
50. *P. ARANEOIDES*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 317. 13.  
*Ectatomma rugosum*, *Roger, Berl. Ent. Zeitschr.* (1863), p. 17 (nec  
*Smith*).  
*Hab.* Ceylon.
51. *P. (FORMICA) EXUDANS*, *Walk. Ann. & Mag. Nat. Hist.* (1859)  
iv. 371, ♂.  
*Hab.* Ceylon.
52. *P. (FORMICA) MENTANS*, *Walk. Ann. & Mag. Nat. Hist.* (1859)  
iv. 371, ♂.  
*Hab.* Ceylon.

Gen. OOCERÆA, *Roger*.

1. OOCERÆA FRAGOSA, *Roger, Berl. Ent. Zeitschr.* (1842), 249, ♂, Taf. i. fig. 16 a.  
*Hab.* Ceylon.

Gen. PACHYCONDYLA, *Smith*.

1. PACHYCONDYLA MELANCHOLICA, *Smith, Proc. Linn. Soc.* viii. 71. 1, ♂.  
*Hab.* Morty Island.

Gen. ECTATOMMA, *Smith*.

1. ECTATOMMA RUGOSA, *Smith, Proc. Linn. Soc.* iii. 143. 1, ♂.  
*Hab.* Aru; Ceram; Sula.

Gen. AMBLYOPONE, *Erichs.*

1. AMBLYOPONE CASTANEA, *Smith, Proc. Linn. Soc.* v. 105. 1, ♂.  
*Hab.* Bachian; Ceram.  
 2. A.? TESTACEA, *Motsch. Bull. Imp. Soc. des Nat. Mosc.* (1863), 15, ♀.  
*Hab.* Ceylon (Colombo).

Gen. ANOMMA, *Shuck.*

1. ANOMMA ERRATICA, *Smith, Proc. Linn. Soc.* viii. 71. 1, ♀.  
*Hab.* New Guinea.

Gen. TYPHLOPONE, *West.*

1. TYPHLOPONE LÆVIGATA, *Smith, Proc. Linn. Soc.* ii. 70. 1, ♂.  
*Hab.* Singapore.

Gen. MESOXENA, *Smith*.

1. MESOXENA MISTURA, *Smith, Proc. Linn. Soc.* v. 107. 1, ♂.  
*Hab.* Bachian.

Fam. MYRMICIDÆ, *Smith*.Gen. MYRMICA, *Latr.*

1. MYRMICA LONGIPES, *Smith, Proc. Linn. Soc.* ii. 70. 1, ♂.  
*Isomyrmex longipes, Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862), 739. 1.  
*Hab.* Singapore; Borneo.  
 2. M. (MONOMORIUM?) PELLUCIDA, *Smith, Proc. Linn. Soc.* ii. 71. 2, ♂.  
*Hab.* Singapore.

3. *MYRMICA AGILIS*, *Smith, Proc. Linn. Soc.* ii. 71. 4.  
*Hab.* Malacca.
4. *M. (MONOMORIUM?) VASTATOR*, *Smith, Proc. Linn. Soc.* ii. 71. 3.  
*Hab.* Malacca.
5. *M. PARALLELA*, *Smith, Proc. Linn. Soc.* iii. 147. 1, ♀.  
*Hab.* Aru.
6. *M. SCABROSA*, *Smith, Proc. Linn. Soc.* iii. 147. 2, ♂.  
*Hab.* Aru.
7. *M. THORACICA*, *Smith, Proc. Linn. Soc.* iii. 148. 3, ♂.  
*Hab.* Aru.
8. *M. MELLEA*, *Smith, Proc. Linn. Soc.* iii. 148. 5, ♀.  
*Hab.* Aru.
9. *M. CARINATA*, *Smith, Proc. Linn. Soc.* iii. 148. 6, ♂.  
*Hab.* Aru.
10. *M. GRACILESCENS*, *Smith, Proc. Linn. Soc.* v. 74. 2, ♂.  
*Hab.* Celebes.
11. *M. PONEROIDES*, *Smith, Proc. Linn. Soc.* v. 107. 2, ♂.  
*Hab.* Bachian ; Ceram ; Bouru.
12. *M. OBLONGA*, *Smith, Proc. Linn. Soc.* v. 107. 1, ♂.  
*Hab.* Bachian.
13. *M. PUNCTATA*, *Smith, Proc. Linn. Soc.* v. 108. 3, ♂.  
*Hab.* Bachian.
14. *M. MODESTA*, *Smith, Proc. Linn. Soc.* v. 108. 4, ♂.  
*Hab.* Bachian.
15. *M. LÆVISSIMA*, *Smith, Proc. Linn. Soc.* v. 108. 5, ♀.  
*Hab.* Bachian.
16. *M. POLITA*, *Smith, Proc. Linn. Soc.* v. 108. 6, ♂.  
*Hab.* Bachian.
17. *M. CÆCA*, *Smith, Proc. Linn. Soc.* v. 108. 7, ♂.  
*Hab.* New Guinea.
18. *M. MOLESTA*, *Say, Bost. Journ. Nat. Hist.* i. 293. 6 ; *Smith, Cat. Brit. Hym. Form.* p. 34. 13.  
*M. domestica*, *Shuck. Mag. Nat. Hist.* (1838), p. 628 ; *Curtis, Trans. Linn. Soc.* xxi. 217. 13 ; *Nyl. Form. Fr. et d'Algér.* 98. 26.  
*M. Pharaonis*, *Roger, Berl. Ent. Zeitschr.* (1862) ; *Mayr, Myrm. Stud.* 752. 1.  
*Formica Pharaonis*, *Linn. Syst. Nat.* ii. 963. 8 ?  
*Hab.* Europe ; Egypt ; Cape of Good Hope ; Celebes ; India ; Philippines ; Australia ; Canada ; New York ; South America ; Brazil.



19. MYRMICA PEDESTRIIS, *Smith, Proc. Linn. Soc.* vi. 46. 2, ♀.  
*Hab.* Celebes.
20. M. RUFICEPS, *Smith, Proc. Linn. Soc.* vi. 46. 3, ♀.  
*Hab.* Celebes.
21. M. FUSCIPENNIS, *Smith, Proc. Linn. Soc.* vi. 46. 4, ♀.  
*Hab.* Celebes.
22. M. PERTINAX, *Smith, Proc. Linn. Soc.* vi. 46. 5, ♂.  
*Hab.* Celebes.
23. M. VEXATOR, *Smith, Proc. Linn. Soc.* vi. 47. 6, ♀.  
*Hab.* Ternate.
24. M. INSOLENS, *Smith, Proc. Linn. Soc.* vi. 47. 7, ♂.  
*Hab.* Menado.
25. M. OPACA, *Smith, Proc. Linn. Soc.* vi. 47. 8, ♂.  
*Hab.* Celebes.
26. M. INCERTA, *Smith, Proc. Linn. Soc.* vii. 21. 2, ♂.  
*Crematogaster incerta?*  
*Hab.* Mysol.
27. M. MÆSTA, *Smith, Proc. Linn. Soc.* vii. 21. 3, ♂.  
*Hab.* Martabello.
28. M. UMBRIPENNIS, *Smith, Proc. Linn. Soc.* vii. 21. 4, ♂.  
*Hab.* Mysol.
29. M.? QUADRISPINOSA, *Smith, Proc. Linn. Soc.* viii. 72. 2, ♂,  
pl. 4. fig. 6.  
*Hab.* Salwatty.
30. M. MALIGNA, *Smith, Proc. Linn. Soc.* viii. 72. 3, ♀.  
*Hab.* Morty Island.
31. M. ASPERSA, *Smith, Proc. Linn. Soc.* viii. 72. 4, ♂.  
*Hab.* Morty Island.
32. M. DILIGENS, *Smith, Proc. Linn. Soc.* viii. 73. 5, ♂.  
*Hab.* New Guinea.
33. M. HUMILIS, *Smith, Cat. Hym. Ins. Form.* vi. 123. 38, ♀.  
*Hab.* India (Bombay).
34. M. RUGIFRONS, *Smith, Cat. Hym. Ins. Form.* vi. 124. 39, ♀.  
*Hab.* India; Penang.
35. M. BIDENTATA, *Smith, Cat. Hym. Ins. Form.* vi. 124. 40, ♂.  
*Hab.* Calcutta.
36. M. FRAGILIS, *Smith, Cat. Hym. Ins. Form.* vi. 124. 42, ♂.  
*Hab.* Singapore.

37. *MYRMICA BASALIS*, *Smith, Cat. Hym. Ins. Form.* vi. 125. 43, ♀.  
*Hab.* Ceylon.
38. *M. CONTIGUA*, *Smith, Cat. Hym. Ins. Form.* vi. 125. 44, ♀.  
*Hab.* Ceylon.
39. *M. (MONOMORIUM) GLYCIPHILA*, *Cat. Hym. Ins. Form.* vi. 125. 45.  
*Hab.* Ceylon.
40. *M. TRACHYLISSA*, *Smith, Cat. Hym. Ins. Form.* vi. 126. 47, ♀.  
*Hab.* Borneo.
41. *M.?* *CONSTERNENS*, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv.  
 374, ♂, ♀.  
*Hab.* Ceylon.
42. *M. PALLINODIS*, *Motsch. Bull. Soc. Nat. Mosc.* (1863), 16, ♀.  
*Hab.* Ceylon.
43. *M. OBSCURATA*, *Motsch. Bull. Soc. Nat. Mosc.* (1863), 16, ♀.  
*Hab.* Ceylon.

Gen. *MYRMECINA*, *Curtis.*

1. *MYMECINA PILICORNIS*, *Smith, Cat. Hym. Ins. Form.* vi. 133. 2, ♂  
*Hab.* India (Bombay).

Gen. *PODOMYRMA*, *Smith.*

1. *PODOMYRMA FEMORATA*, *Smith, Proc. Linn. Soc.* iii. 145. 1, ♀.  
*Hab.* Aru.
2. *P. STRIATA*, *Smith, Proc. Linn. Soc.* iii. 146. 2, ♀.  
*Hab.* Aru. —
3. *P. LÆVIFRONS*, *Smith, Proc. Linn. Soc.* iii. 146. 3, ♀.  
*Hab.* Aru.
4. *P. BASALIS*, *Smith, Proc. Linn. Soc.* iii. 147. 4, ♀, ♀.  
*Hab.* Aru; Amboyna; New Guinea; Mysol; Bouru.
5. *P. NITIDA*, *Smith, Proc. Linn. Soc.* v. 110. 2, ♀.  
*Hab.* New Guinea.
6. *P. SILVICOLA*, *Smith, Proc. Linn. Soc.* v. 110. 3, ♀.  
*Hab.* Bachian; Morty Island.
7. *P. SIMILLIMA*, *Smith, Proc. Linn. Soc.* v. 111. 4, ♀.  
*Hab.* Bachian.
8. *P. LÆVISSIMA*, *Smith, Proc. Linn. Soc.* vii. 20. 2, ♀.  
*Hab.* Mysol.
9. *P. RUFICEPS*, *Smith, Proc. Linn. Soc.* vii. 203, ♀.  
*Hab.* Mysol.

## Gen. PSEUDOMYRMA, Guér.

1. PSEUDOMYRMA (TETRAPONERA) ATRATA, *Smith, Ann. & Mag. Nat. Hist.* 2nd ser. ix. 45, ♀; *Cat. Hym. Ins. Form.* vi. 159. 26; *Proc. Linn. Soc.* ii. 70. 1.  
*Hab.* India; Borneo; Ceylon.
2. P. LÆVICEPS, *Smith, Proc. Linn. Soc.* iii. 145. 1, ♂.  
*Hab.* India; New Guinea; Aru.
3. P. CARBONARIA, *Smith, Proc. Linn. Soc.* vii. 20. 2, ♂.  
*Hab.* Bouru.
4. P. (ECITON) RUFONIGRA, *Jerdon, Madr. Journ.* iii. p. 53; *Smith, Proc. Linn. Soc.* viii. 73. 2; *Cat. Hym. Ins. Form.* vi. 159. 24.  
*Sima rufo-nigra*, *Roger, Berl. Ent. Zeitschr.* (1863), sp. 68.  
*Hab.* India; Morty Island.
5. P. MODESTA, *Smith, Proc. Linn. Soc.* v. 106. 2, ♂.  
*Hab.* Bachian.
6. P. NITIDA, *Smith, Proc. Linn. Soc.* v. 106. 3, ♀.  
*Hab.* Bachian.
7. P. (ECITON) RUFIPES, *Jerdon, Madr. Journ.* (1851), 112, ♂; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 53; *Smith, Cat. Hym. Ins. Form.* vi. 159. 23.  
*Hab.* India (Salem district).
8. P. (ECITON) MINUTA, *Jerdon, Madr. Journ.* (1851), 112, ♂; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 53.  
*Hab.* India (the Carnatic and Malabar).
9. P. (ECITON) NIGRA, *Jerdon, Madr. Journ.* (1851), 112, ♂; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 53; *Smith, Cat. Hym. Ins. Form.* vi. 159. 25.  
*Hab.* India (the Carnatic and Malabar).
10. P. PILOSA, *Smith, Cat. Hym. Ins. Form.* vi. 160. 27, ♀.  
*Sima nigra*, *Roger, Berl. Ent. Zeitschr.* (1863), 25.  
*Hab.* Borneo.
11. P. ALLABORANS, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 375, ♂.  
*Hab.* Ceylon.

## Gen. SIMA, Roger.

1. SIMA COMPRESSA, *Roger, Berl. Ent. Zeitschr.* (1863), 179. 68, ♀.  
*Hab.* Ceylon.

Gen. LEPTOMYRMA, *Motsch.*

1. LEPTOMYRMA GRACILIPES, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 17, ♂.

Pheidole (worker minor?).

*Hab.* Ceylon (mountains of Nura Ellia).

Gen. CERAPACHYS, *Smith.*

1. CERAPACHYS ANTENNATUS, *Smith, Proc. Linn. Soc.* ii. 74. 1, ♂.

*Hab.* Borneo; Celebes.

2. C. OCULATUS, *Smith, Proc. Linn. Soc.* ii. 74. 2, ♂.

*Hab.* Borneo.

3. C. FEMORALIS, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 21.

*Hab.* Ceylon.

4. C. CEYLONICA, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 22.

*Hab.* Ceylon.

Gen. CREMATOGASTER, *Lund.*

1. CREMATOGASTER KIRBII, *Smith, Cat. Hym. Ins. Form.* vi. 136. 4.

*Myrmica* Kirbii, *Sykes, Trans. Ent. Soc. Lond.* i. 99, pl. 13, figs. 2, 3.

*Hab.* India (Poona).

2. C. ANTHRACINUS, *Smith, Proc. Linn. Soc.* ii. 75. 1, ♂; *Cat. Hym. Ins. Form.* vi. 136. 5.

*Hab.* Singapore; Ceylon.

3. C. BRUNNEUS, *Smith, Proc. Linn. Soc.* ii. 75. 2, ♂; *Cat. Hym. Ins. Form.* vi. 138. 10.

*Hab.* Borneo; Ceylon.

4. C. CEPHALOTES, *Smith, Proc. Linn. Soc.* ii. 75. 3, ♂; *Cat. Hym. Ins. Form.* vi. 137. 9.

*Hab.* Borneo; Aru.

5. C. OBSCURUS, *Smith, Proc. Linn. Soc.* ii. 76. 4, ♂.

*Hab.* Borneo; Bachian; Aru.

6. C. INFLATUS, *Smith, Proc. Linn. Soc.* ii. 76. 5, ♂; *Cat. Hym. Ins. Form.* vi. 136. 6, pl. 9. f. 1.

*Hab.* Borneo; Birmah; Singapore.

7. C. DIFFORMIS, *Smith, Proc. Linn. Soc.* ii. 76. 6, ♂; *Cat. Hym. Ins. Form.* vi. 137. 7.

*Hab.* Borneo; Celebes; Singapore.

8. C. OCHRACEA, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862), 766. 5, ♂.

*Hab.* Manilla.

9. CREMATOGASTER POLLENS, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 374, ♀.  
*Hab.* Ceylon.
10. C. DEPONENS, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 374, ♀.  
*Hab.* Ceylon.
11. C. FORTICULUS, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 374, ♀.  
*Hab.* Ceylon.
12. C. APICALIS, *Motsch. Bull. Soc. Imp. Mosc.* (1863), 20, ♀.  
*Hab.* Ceylon.
13. C. BRUNNESCENS, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 20.  
*Hab.* Ceylon (near Colombo).

#### Gen. MYRMICARIA, *Saund.*

- Myrmicaria*, *Saund. Trans. Ent. Soc. Lond.* iii. 57, ♂.  
*Physatta*, *Smith, Proc. Linn. Soc.* ii. 77, ♀.  
*Heptacondylus*, *Smith, Proc. Linn. Soc.* ii. 71, ♀.
1. MYRMICARIA BRUNNEA, *Saund. Trans. Ent. Soc. Lond.* iii. 57, pl. 5. fig. 2, ♂; *Smith, Cat. Hym. Ins. Form.* vi. 141. 1, pl. x. figs. 6-8.  
*Hab.* India.
  2. M. VIDUA, *Smith, Cat. Hym. Ins. Form.* vi. 141. 2, ♂.  
*Hab.* Java.
  3. M. (HEPTACONDYLUS) SUBCARINATA, *Smith, Proc. Linn. Soc.* ii. 73. 2, ♀; *Cat. Hym. Ins. Form.* vi. 172. 1.  
*Hab.* Borneo.
  4. M. (HEPTACONDYLUS) CARINATA, *Smith, Proc. Linn. Soc.* ii. 73. 3, ♀; *Cat. Hym. Ins. Form.* vi. 172. 2.  
*Hab.* Borneo.
  5. M. (HEPTACONDYLUS) ARACHNOIDES, *Smith, Proc. Linn. Soc.* ii. 72. 1, ♀.  
*Hab.* Borneo.
  6. M. (HEPTACONDYLUS) LONGIPES, *Smith, Cat. Hym. Ins. Form.* vi. 142. 3, ♀.  
*Hab.* Borneo.
  7. M. (PHYSATTA) DROMEDARIUS, *Smith, Proc. Linn. Soc.* ii. 78. 1  
*Cat. Hym. Ins. Form.* vi. 171. 1, pl. x. figs. 9-11.  
*Hab.* Borneo.



8. MYRMICARIA (PHYSATTA) CRINITA, *Smith, Cat. Hym. Ins. Form.* vi. 171. 2, ♀ (*M. brunnea*, ♀?).

*Hab.* India (Madras).

9. *M.* (PHYSATTA) GIBBOSA, *Smith, Cat. Hym. Ins. Form.* vi. 172. 3, ♀.

*Hab.* Java.

Gen. PHEIDOLE, *Westw.*

1. PHEIDOLE (ATTA) PROVIDENS, *Sykes, Trans. Ent. Soc. Lond.* i. 103, pl. 13. f. 7, f. 5; *Westw. Ann. & Mag. Nat. Hist.* vi. 87 (1841); *Jerdon, Madr. Journ.* (1851), 108; *Ann. & Mag. Nat. Hist.* (1854) xiii. 50. 8.

*Hab.* India (Poona).

2. *P.* (ECODOMA) MALABARICA, *Jerdon, Madr. Journ.* (1851), 107; *Ann. & Mag. Nat. Hist.* (1854) xiii. 49.

*Hab.* India.

3. *P.* (ECODOMA) DIFFUSA, *Jerdon, Madr. Journ.* (1851), 109; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 9.

*Hab.* India.

4. *P.* (ECODOMA) DIVERSA, *Jerdon, Madr. Journ.* (1851), 109; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 10.

*Hab.* India (Wynaad).

5. *P.* (ECODOMA) AFFINIS, *Jerdon, Madr. Journ.* (1851), 110; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 11.

*Hab.* India (Malabar).

6. *P.* (ECODOMA) MINOR, *Jerdon, Madr. Journ.* (1851), 110; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 12.

*Hab.* India (Tellicherry).

7. *P.* (ECODOMA) QUADRISPINOSA, *Jerdon, Madr. Journ.* (1851), 111; *Ann. & Mag. Nat. Hist.* (1854) xiii. 52.

*Hab.* India (Malabar).

8. *P.* OCELLIFERA, *Smith, Cat. Hym. Ins. Form.* vi. 174. 10, ♂.

*Pheidologeton ocellifera*, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862), 750. 1.

*Hab.* Birmah; Hong Kong; Philippines.

9. *P.* JANUS, *Smith, Cat. Hym. Ins. Form.* vi. 175. 11, pl. ix. figs. 13, 17, ♂.

*Hab.* Ceylon.

10. *P.* TAPROBANE, *Smith, Cat. Hym. Ins. Form.* vi. 175. 12, ♂.

*Pheidologeton Taprobane*, *Roger, Berl. Ent. Zeitschr.* (1863), 30.

*Hab.* Ceylon.

11. *PHEIDOLE RUGOSA*, *Smith, Cat. Hym. Ins. Form.* vi. 175. 13, ♂.  
*Hab.* Ceylon.
12. *P. SILENUS*, *Smith, Cat. Hym. Ins. Form.* vi. 176. 14, ♂.  
*Pheidologeton Silenus*, *Mayr, Myrm. Stud. Berl. Zool. Botan. Gesell.*  
(1862), 751. 3.  
*Hab.* Singapore.
13. *P. COMATA*, *Smith, Cat. Hym. Ins. Form.* vi. 176. 15, ♂.  
*Hab.* Borneo.
14. *P. FERVENS*, *Smith, Cat. Hym. Ins. Form.* vi. 176. 15, ♂.  
*Hab.* Singapore.
15. *P. MILITARIS*, *Smith, Proc. Linn. Soc.* v. 74. 1, ♂.  
*Hab.* Celebes (Makassar).
16. *P. NOTABILIS*, *Smith, Proc. Linn. Soc.* v. 111. 1, ♂.  
*Hab.* Bachian.
17. *P. RUBRA*, *Smith, Proc. Linn. Soc.* v. 111. 2, ♂.  
*Hab.* Bachian.
18. *P. PLAGIARIA*, *Smith, Proc. Linn. Soc.* v. 112. 3, ♂.  
*Hab.* Bachian.
19. *P. PABULATOR*, *Smith, Proc. Linn. Soc.* v. 112. 4, ♂.  
*Hab.* Bachian.
20. *P. MEGACEPHALA*, *Smith, Proc. Linn. Soc.* v. 112. 5, ♂.  
*Pheidologeton megacephalus*, *Roger, Berl. Ent. Zeitschr.* (1863), 30.  
*Hab.* Bachian; Celebes; Timor; Tondano; Sula.
21. *P. SINGULARIS*, *Smith, Proc. Linn. Soc.* vii. 22. 2, ♂.  
*Hab.* Mysol.
22. *P. MORDAX*, *Smith, Proc. Linn. Soc.* vii. 22. 3, ♂.  
*Hab.* Mysol.
23. *P. PENETRALIS*, *Smith, Proc. Linn. Soc.* vii. 23. 4, ♂.  
*Hab.* Mysol.
24. *P. HOSPES*, *Smith, Proc. Linn. Soc.* viii. 74. 2, ♂.  
*Hab.* New Guinea.
25. *P. SULCATICEPS*, *Roger, Berl. Ent. Zeitschr.* (1863), 85, ♂, ♀, ♂.  
*Hab.* Ceylon.
26. *P. LATINODA*, *Roger, Berl. Ent. Zeitschr.* (1863), 195. 86, ♀.  
*Hab.* Ceylon.
27. *P. NANUS*, *Roger, Berl. Ent. Zeitschr.* (1863), 191. 84.  
*Pheidologeton*, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862).  
*Hab.* Ceylon.

28. *PHEIDOLE (ATTA) DIDITA*, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 375, ♀.

*Hab.* Ceylon.

29. *P. (ÆCOPHTHORA) CEYLONICA*, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 18, ♂, ♀, ♀.

*Hab.* Ceylon (Colombo and mountains of Nura Ellia and Patannas).

30. *P. (SOLENOPSIS) PUNGENS*, *Smith, Proc. Linn. Soc.* vi. 48, ♀.

*Hab.* Menado.

Gen. *PHEIDOLACANTHINUS*, *Smith*.

1. *PHEIDOLACANTHINUS ARMATUS*, *Smith, Proc. Linn. Soc.* viii. 75.

1, pl. iv. fig. 8, ♀.

*Hab.* Salwatty.

Gen. *SOLENOPSIS*, *Westw.*

1. *SOLENOPSIS CEPHALOTES*, *Smith, Proc. Linn. Soc.* iii. 149. 1.

*Hab.* Aru; Bachian; Celebes; Ceram.

2. *S. TRANSVERSALIS*, *Smith, Proc. Linn. Soc.* v. 74. 1, ♀.

*Hab.* Aru.

3. *S. LABORIOSA*, *Smith, Proc. Linn. Soc.* vi. 48. 2, ♀.

*Hab.* Celebes; Waigiou.

4. *S. CALIDA*, *Smith, Proc. Linn. Soc.* vii. 22. 3, ♀.

*Hab.* Ceram.

5. *S. LÆVIS*, *Smith, Proc. Linn. Soc.* viii. 75. 1, ♀.

*Hab.* Morty Island.

Gen. *ATTA*, *Latr.*

1. *ATTA INSTABILIS*, *Smith, Cat. Hym. Ins. Form.* vi. 163. 10, ♀.

*Hab.* N. India.

2. *A. BELLICOSA*, *Smith, Cat. Hym. Ins. Form.* vi. 164. 11, ♀.

*Hab.* Birmah.

3. *A. NODIFER*, *Smith, Cat. Hym. Ins. Form.* vi. 165. 44, ♀.

*Hab.* North China.

4. *A. CINGULATA*, *Smith, Proc. Linn. Soc.* ii. 77. 2, ♀.

*Hab.* Borneo.

5. *A. PENETRANS*, *Smith, Proc. Linn. Soc.* ii. 77. 1, ♀.

*Hab.* Borneo.

Gen. *TYPHLATTA*, *Smith*.

1. *TYPHLATTA LÆVICEPS*, *Smith, Proc. Linn. Soc.* ii. 79. 1, ♀.

*Hab.* Borneo.

Gen. CAREBARA, *Westw.*

1. CAREBARA LIGNATA, *Westw. Ann. & Mag. Nat. Hist.* (1841) vi. 86, pl. 6. fig. 6; *Smith, Cat. Hym. Ins. Form.* vi. 178. 1.

*Hab.* Java.

2. C. CASTANEA, *Smith, Cat. Hym. Ins. Form.* vi. 178. 2, ♀.

*Hab.* Hong Kong.

Gen. STRUMIGENYS, *Smith.*

1. STRUMIGENYS (LABIDOGENYS) LYROESSA, *Roger, Berl. Ent. Zeitschr.* (1862), 251, Taf. 1. fig. 17, ♀.

*Hab.* Ceylon.

Fam. CRYPTO CERIDÆ, *Smith.*Gen. MERANOPLUS, *Smith.*

1. MERANOPLUS CASTANEUS, *Smith, Proc. Linn. Soc.* ii. 81. 1, ♀; *Cat. Hym. Ins. Form.* vi. 194. 5.

*Hab.* Borneo.

2. M. CORDATUS, *Smith, Proc. Linn. Soc.* ii. 82. 2, ♂; *Cat. Hym. Ins. Form.* vi. 193. 3.

*Hab.* Borneo.

3. M. MUCRONATUS, *Smith, Proc. Linn. Soc.* ii. 82. 3, ♂; *Cat. Hym. Ins. Form.* vi. 194. 4.

*Hab.* Malacca.

4. M. (CRYPTOCERUS) BICOLOR, *Guér. Icon. Règ. Anim.* p. 425; *Smith, Mon. Crypt., Trans. Ent. Soc. Lond.* 2nd. ser. ii. 224. 1.

*M. villosus*, *Motsch. Etud. Ent.* (1859), p. 115.

*M. dimicans*, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 375. ♂.

*Hab.* India (Pondicherry); Ceylon.

5. M. SPINOSUS, *Smith, Proc. Linn. Soc.* iii. 150. 1.

*Hab.* Aru.

Gen. CATAULACUS, *Smith.*

1. CATAULACUS SETOSUS, *Smith, Proc. Linn. Soc.* v. 114. 1, ♂.

*Hab.* Bachian; Mysol; Waigiou.

2. C. FLAGITIOSUS, *Smith, Proc. Linn. Soc.* vi. 49. 1, ♀.

*Hab.* Celebes.

3. C. HISPIDULUS, *Smith, Proc. Linn. Soc.* viii. 76. 1, pl. iv. fig. 7, ♂.

*Hab.* Sumatra.

4. *CATAULACUS TAPROBANE*, *Smith, Mon. Crypt., Trans. Ent. Soc. Lond.* 2nd. ser. ii. 225. 1, pl. 20. fig. 10, ♀; *Cat. Hym. Ins. Form.* vi. 195. 1.

*Hab.* Ceylon.

5. *C. GRANULATUS*, *Smith, Mon. Crypt., Trans. Ent. Soc. Lond.* new ser. ii. 226. 4; *Cat. Hym. Ins. Form.* 196. 4.

*Formica granulata*, *Latr. Hist. Nat. Fourm.* p. 275, pl. 12. fig. 75, ♀.

*Cryptocerus granulatus*, *St.-Farg. Hym.* i. 171. 2.

*Hab.* India.

6. *C. INSULARIS*, *Smith, Proc. Linn. Soc.* ii. 80. 1, ♂; *Cat. Hym. Ins. Form.* vi. 197. 7.

*Hab.* Borneo.

7. *C. HORRIDUS*, *Smith, Proc. Linn. Soc.* ii. 81. 2, ♀; *Cat. Hym. Ins. Form.* vi. 196. 5.

*Hab.* Borneo; Malacca.

8. *C. RETICULATUS*, *Smith, Proc. Linn. Soc.* v. 81. 3, ♀; *Cat. Hym. Ins. Form.* vi. 196. 6.

*Hab.* Malacca.

#### Gen. CEPHALOXYIS, *Smith*.

1. *CEPHALOXYIS CAPITATA*, *Smith, Proc. Linn. Soc.* viii. 77. 1, ♀.

*Hab.* New Guinea.

#### Fam. DORYLIDÆ, *Shuck*.

##### Gen. DORYLUS, *Latr*.

1. *DORYLUS LABIATUS*, *Shuck. Ann. & Mag. Nat. Hist.* (1840), v. 319. 6; *West. Arc. Ent.* i. 80. 6.

*Hab.* India (Poonah and Assam).

2. *D. HINDOSTANUS*, *Smith, Cat. Hym. Ins. Dor. & Thynn.* vii. 3. 7.

*Hab.* India (Punjaub).

3. *D. ORIENTALIS*, *Westw. Proc. Zool. Soc.* (1835), p. 72; *Arc. Ent.* i. 80. 7; *Shuck. Mon. Dor., Ann. & Mag. Nat. Hist.* (1840) v. 320. 7.

*Hab.* India (Bengal).

4. *D. LONGICORNIS*, *Shuck. Mon. Dor., Ann. & Mag. Nat. Hist.* (1840) v. 321. 8; *West. Arc. Ent.* i. 80. 8.

*Hab.* India.



Gen. *ÆNICTUS*, *Shuck.*

1. *ÆNICTUS AMBIGUUS*, *Shuck. Mon. Dor., Ann. & Mag. Nat. Hist.* (1840) v. 268; *Westw. Arc. Ent.* i. 79. 1.  
*Hab.* India (Poonah).
2. *Æ. CERTUS*, *Westw. Arc. Ent.* i. 79. 2.  
*Hab.* India?
3. *Æ. PUBESCENS*, *Smith, Cat. Hym. Ins. Dor. & Thynn.* 10. 4.  
*Hab.* N. India.
4. *Æ. OBSCURUS*, *Smith, Proc. Linn. Soc.* viii. 79. 1.  
*Hab.* New Guinea.
5. *Æ. POROZONOIDES*, *Walk. Ann. & Mag. Nat. Hist.* (1860) v. 306, ♂.  
*Hab.* Ceylon.

Fam. *MUTILLIDÆ*, *Leach.*Gen. *MUTILLA*, *Linn.*

1. *MUTILLA ANALIS*, *St.-Farg. Hym.* iii. 630. 52, ♂; *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 30. 165.  
*Hab.* India.
2. *M. FUSCIPENNIS*, *St.-Farg. Hym.* iii. 602. ♂.  
*Hab.* Java.
3. *M. DIMIDIATA*, *St.-Farg. Hym.* iii. 628. 50, ♂.  
*Hab.* India.
4. *M. BENGALENSIS*, *St.-Farg. Hym.* iii. 637. 63, ♀.  
*Hab.* Bengal.
5. *M. GLABRATA*, *Fabr. Syst. Piez.* p. 438. 45, ♀; *Oliv. Ency. Méth.* viii. 65. 64.  
*Hab.* India.
6. *M. INDICA*, *Linn. Syst. Nat.* i. 966. 3, ♀.  
*Hab.* India.
7. *M. NIGRIPES*, *Fabr. Syst. Piez.* p. 439. 51, ♀.  
*Hab.* India.
8. *M. RUFOGASTRA*, *St.-Farg. Hym.* iii. 629. 51, ♂.  
*Hab.* India; China; Celebes.
9. *M. RUGOSA*, *Oliv. Ency. Méth.* viii. 61. 35, ♀.  
*Hab.* India.

10. *MUTILLA SEXMACULATA*, *Swed. Nov. Act. Holm.* viii. 286. 44, ♀.  
*M. fuscipennis*, *Fabr. Syst. Piez.* p. 436. 35, ♂.  
*Hab.* India.
11. *M. OCLATA*, *Fabr. Syst. Piez.* p. 432. 19, ♀; *Oliv. Ency. Méth.* viii. 60. 32.  
*Hab.* Hong Kong.
12. *M. ANTENNATA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31.  
166, ♂.  
*Hab.* India.
13. *M. ARGENTIPES*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31.  
167, ♀.  
*Hab.* India.
14. *M. AURIFRONS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31.  
168, ♀.  
*Hab.* India.
15. *M. BLANDA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32.  
170, ♀.  
*Hab.* India; Malacca.
16. *M. DIVERSA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32.  
171, ♀.  
*Hab.* India.
17. *M. DIVES*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32. 172, ♀.  
*Hab.* India.
18. *M. INDOSTANA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33.  
175, ♂.  
*Hab.* Madras.
19. *M. MIRANDA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33.  
176, ♀.  
*Hab.* India.
20. *M. NOBILIS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33. 178.  
*Hab.* Madras.
21. *M. OPTIMA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34. 179, ♀.  
*Hab.* India.
22. *M. OPULENTA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34.  
180, ♂.  
*Hab.* India.
23. *M. PULCHRINA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34.  
181, ♀.  
*Hab.* Madras.

24. *MUTILLA REPRESENTANS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 35. 182, ♀.  
*Hab.* India; Borneo; Malacca.
25. *M. RETICULATA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 35. 183, ♀.  
*Hab.* India.
26. *M. RUFIVENTRIS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 36. 184, ♀.  
*Hab.* India.
27. *M. SEMIAURATA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 36. 187, ♂, ♀.  
*Hab.* India.
28. *M. AULICA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 37. 189, ♀.  
*Hab.* N. India.
29. *M. FUNERARIA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 37. 190, ♀.  
*Hab.* N. India.
30. *M. PUSILLA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 37. 191, ♀.  
*Hab.* N. India.
31. *M. REGIA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 192, ♀.  
*Hab.* N. India.
32. *M. UNIFASCIATA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 193, ♂.  
*Hab.* N. India; Celebes.
33. *M. CHINENSIS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 194, ♀.  
*Hab.* N. China.
34. *M. DESPONSA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 195, ♂.  
*Hab.* N. China.
35. *M. VARIEGATA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 39. 196, ♀.  
*Hab.* N. China.
36. *M. SINENSIS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 39. 198, ♂, ♀.  
*Hab.* Hong Kong.
37. *M. SPECIOSA*, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 40. 199, ♀.  
*Hab.* Hong Kong.

38. *MUTILLA PHILIPPINENSIS*, *Smith, Cat. Hym. Ins. Mut. & Pomp.*  
iii. 40. 200, ♀.  
*Hab.* Philippines.
39. *M. DEIDAMIA*, *Smith, Proc. Linn. Soc.* ii. 83. 3, ♀.  
*Hab.* Borneo.
40. *M. URANIA*, *Smith, Proc. Linn. Soc.* ii. 83. 4, ♀.  
*Hab.* Borneo.
41. *M. SUSPICIOSA*, *Smith, Proc. Linn. Soc.* ii. 84. 5, ♂.  
*Hab.* Borneo; Bachian; Celebes; Amboyna; Bouru; Flores.
42. *M. GRACILLIMA*, *Smith, Proc. Linn. Soc.* ii. 84. 6, ♂.  
*Hab.* Borneo.
43. *M. FAMILIARIS*, *Smith, Proc. Linn. Soc.* ii. 84. 7, ♀.  
*Hab.* Singapore; Borneo.
44. *M. CALLIOPE*, *Smith, Proc. Linn. Soc.* ii. 85. 8, ♀.  
*Hab.* Borneo.
45. *M. PROSERPINA*, *Smith, Proc. Linn. Soc.* ii. 85. 9, ♀.  
*Hab.* Borneo.
46. *M. PANDORA*, *Smith, Proc. Linn. Soc.* ii. 85. 10, ♀.  
*Hab.* Borneo.
47. *M. SIBYLLA*, *Smith, Proc. Linn. Soc.* ii. 86. 11, ♀\*.  
*Hab.* Borneo; Celebes; Aru.
48. *M. CASSIOPE*, *Smith, Proc. Linn. Soc.* ii. 86. 12, ♀.  
*Hab.* Borneo.
49. *M. DARDANUS*, *Smith, Proc. Linn. Soc.* ii. 86. 13, ♀.  
*Hab.* Borneo.
50. *M. UNIMACULATA*, *Smith, Proc. Linn. Soc.* ii. 87. 14, ♀.  
*Hab.* Borneo; Celebes.
51. *M. VOLATILIS*, *Smith, Proc. Linn. Soc.* iii. 9. 4, ♂.  
*Hab.* Celebes.
52. *M. MANIFESTA*, *Smith, Proc. Linn. Soc.* iii. 150. 2, ♂, ♀.  
*Hab.* Aru.
53. *M. CARINATA*, *Smith, Proc. Linn. Soc.* iii. 150. 3, ♀.  
*Hab.* Aru.
54. *M. NIGRA*, *Smith, Proc. Linn. Soc.* iii. 151. 4, ♂.  
*Hab.* Aru; Celebes.
55. *M. EXILIS*, *Smith, Proc. Linn. Soc.* iii. 151. 5, ♂.  
*Hab.* Aru.

\* No. 41 is the male of this species, taken *in coitu*.

56. *MUTILLA MAURA*, *Smith, Proc. Linn. Soc.* v. 75. 3, ♂.  
*Hab.* Celebes.

57. *M. FACILIS*, *Smith, Proc. Linn. Soc.* v. 76, 4, ♂.  
*Hab.* Celebes.

58. *M. THORACICA*, *Smith, Proc. Linn. Soc.* v. 76. 5, ♂.  
*Hab.* Celebes.

59. *M. NEGLECTA*, *Smith, Proc. Linn. Soc.* v. 76. 6, ♂.  
*Hab.* Celebes.

60. *M. FERVIDA*, *Smith, Proc. Linn. Soc.* v. 76. 7, ♂, ♀.  
*Hab.* Celebes.

61. *M. MEROPS*, *Smith, Proc. Linn. Soc.* v. 115. 2, ♀.  
*Hab.* Bachian; Gilolo.

62. *M. IANTHEA*, *Smith, Proc. Linn. Soc.* v. 115. 3, ♂, ♀.  
*Hab.* Bachian; Gilolo.

63. *M. ANTHYLLA*, *Smith, Proc. Linn. Soc.* v. 115. 4, ♂.  
*Hab.* Bachian; Gilolo; Ceram; Amboyna.

64. *M. ZEBINA*, *Smith, Proc. Linn. Soc.* v. 115. 5, ♀.  
*Hab.* Bachian.

65. *M. PENTHEUS*, *Smith, Proc. Linn. Soc.* v. 116. 6, ♀.  
*Hab.* Bachian; New Guinea.

66. *M. DORICHA*, *Smith, Proc. Linn. Soc.* v. 116. 7, ♀.  
*Hab.* New Guinea (Dory); Bachian; Ceram; Amboyna.

67. *M. MIRABILIS*, *Smith, Proc. Linn. Soc.* vii. 24. 5, ♂.  
*Hab.* Waigiou.

68. *M. DAMIA*, *Smith, Proc. Linn. Soc.* vii. 24. 6, ♂.  
*Hab.* Ceram.

69. *M. THERA*, *Smith, Proc. Linn. Soc.* vii. 24. 7, ♀.  
*Hab.* Ceram.

70. *M. FAUSTA*, *Smith, Proc. Linn. Soc.* vii. 25. 8, ♀.  
*Hab.* Mysol.

71. *M. AGILIS*, *Smith, Proc. Linn. Soc.* viii. 79. 5, ♂.  
*Hab.* New Guinea.

72. *M. FLUCTUATA*, *Smith, Proc. Linn. Soc.* viii. 80. 6, ♂.  
*Hab.* Morty Island.



Gen. APTEROGYNA, *Latr.*

1. APTEROGYNA MUTILLOIDES, *Smith, Cat. Hym. Ins. Mut. & Pomp.*  
iii. 64. 5, ♂, ♀.

*Hab.* India.

Gen. MYRMOSIDA, *Smith.*

1. MYRMOSIDA PARADOXA, *Smith, Proc. Linn. Soc.* ii. 88. 1, ♀, tab. 2.  
fig. 1.

*Hab.* Singapore.

Fam. THYNNIDÆ, *Erichs.*Gen. THYNNUS, *Fabr.*

1. THYNNUS ERRATICUS, *Smith, Proc. Linn. Soc.* v. 114. 1, ♂.

*Hab.* Bachian.

2. T. ATRATUS, *Smith, Proc. Linn. Soc.* vi. 51. 1, ♂, & viii. 77.  
2, ♀.

*Hab.* Gilolo.

3. T. (AGRIOMYIA) VAGANS, *Smith, Proc. Linn. Soc.* vi. 51. 2, ♂, ♀.

*Hab.* Gilolo.

4. T. LUGUBRIS, *Smith, Proc. Linn. Soc.* vii. 25. 1, ♂.

*Hab.* Ceram.

5. T. INSULARIS, *Smith, Proc. Linn. Soc.* vii. 26. 2, ♀.

*Hab.* Mysol.

6. T. PLACIDUS, *Smith, Proc. Linn. Soc.* vii. 26. 3, ♂.

*Hab.* Waigiu.

7. T. PULLATUS, *Smith, Proc. Linn. Soc.* vii. 26. 4, ♂, ♀.

*Hab.* Bouru.

8. T. LÆVISSIMUS, *Smith, Proc. Linn. Soc.* viii. 77. 1, ♀.

*Hab.* New Guinea.

9. T. (AGRIOMYIA) ABDUCTOR, *Smith, Proc. Linn. Soc.* viii. 78.  
3, ♂.

*Hab.* Salwatty; New Guinea.

Gen. ÆLURUS, *Klug.*

1. ÆLURUS COMATUS, *Smith, Proc. Linn. Soc.* vii. 27. 1, ♂.

*Hab.* Waigiu.

Gen. ISWARA, *Westw.*

1. ISWARA LUTEUS, *Westw. Trans. Ent. Soc. Lond.* new ser. i. pl. 7. fig. 5.

*Hab.* India.

Gen. METHOCA, *Latr.*

1. METHOCA GRACILIS, *Smith, Proc. Linn. Soc. v. 77. 1, ♂.*  
*Hab. Celebes.*
2. M. INSULARIS, *Smith, Proc. Linn. Soc. v. 77. 2, ♀.*  
*Hab. Celebes.*
3. M. THORACICA, *Smith, Proc. Linn. Soc. vi. 50. 1, ♀, pl. 1. fig. 5.*  
*Hab. Celebes.*

Gen. SCLERODERMA, *Latr.*

1. SCLERODERMA BICOLOR, *Smith, Proc. Linn. Soc. v. 77. 1, ♀.*  
*Hab. Celebes.*
2. S. MODESTA, *Smith, Proc. Linn. Soc. vii. 27. 1, ♀.*  
*Hab. Mysol.*

Tribe Fossores, *Latr.*Fam. SCOLIADÆ, *Leach.*Gen. TIPHIA, *Fabr.*

1. TIPHIA COMPRESSA, *Smith, Cat. Hym. Ins. Mut. & Pomp. iii. 82.*  
4, ♀.  
*Hab. Philippines.*
2. T. HIRSUTA, *Smith, Cat. Hym. Ins. Mut. & Pomp. iii. 83. 5, ♂.*  
*Hab. N. India.*
3. T. RUFIPES, *Smith, Cat. Hym. Ins. Mut. & Pomp. iii. 83. 6, ♀.*  
*Hab. N. India.*
4. T. RUFO-FEMORATA, *Smith, Cat. Hym. Ins. Mut. & Pomp. iii. 83.*  
7, ♀.  
*Hab. N. India.*
5. T. FUMIPENNIS, *Smith, Proc. Linn. Soc. ii. 90. 1, ♀.*  
*Hab. Borneo.*
6. T. STIGMA, *Smith, Proc. Linn. Soc. ii. 91. 2, ♂.*  
*Hab. Borneo.*
7. T. FLAVIPENNIS, *Smith, Proc. Linn. Soc. ii. 91. 3, ♀.*  
*Hab. Borneo.*
8. T. CARBONARIA, *Smith, Proc. Linn. Soc. v. 118. 1, ♀.*  
*Hab. Bachian.*
9. T. INTRUDENS, *Smith, Proc. Linn. Soc. vii. 25. 1, ♀.*  
*Hab. Mysol.*

Gen. MYZINE, *Latr.*

1. MYZINE TRICOLOR, *Smith, Proc. Linn. Soc.* ii. 91. 1, ♀.  
*Hab.* Borneo.
2. M. TENUICORNIS, *Smith, Proc. Linn. Soc.* iii. 151. 1, ♂.  
*Hab.* Aru.

Gen. SCOLIA, *Fabr.*

Div. 1. The anterior wings with three submarginal cells and one recurrent nervure.

(Subgenus *Triscolia*, *Sauss. & Sich.*)

1. SCOLIA PROCER, *Illig. Mag.* i. 196. 26, ♂, ♀; *Fabr. Syst. Piez.* p. 238. 1; *Burm. Mon. Scol.* p. 19. 9.  
*S. capitata*, *Fabr. Syst. Piez.* p. 239. 3, ♂; *Smith, Cat. Hym. Ins.* iii. 111. 122.  
*Triscolia procer*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* 43. 16.  
*Scolia patricialis*, *Sauss. & Sich. (nec Burm. & Smith).*  
*Hab.* Java; Sumatra; Singapore.
2. S. PATRICIALIS, *Burm. Mon. Scol.* p. 19. 10; *Smith, Cat. Hym. Ins.* iii. 110. 121.  
*Hab.* Malabar; Sumatra; China (Penang).
3. S. NUDATA, *Smith, Cat. Hym. Ins.* iii. 110. 120.  
*Hab.* North Bengal.
4. S. RUBIGINOSA, *Fabr. Syst. Piez.* p. 241. 10; *Klug, Weber & Mohr, Beitr.* ii. 211. 38; *St.-Farg. Hym.* iii. 518. 2; *Burm. Mon. Scol.* p. 19. 11; *Smith, Cat. Hym. Ins.* iii. 111. 123; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 45. 20.  
*S. ornata*, *St.-Farg. Hym.* iii. 517. 1, ♀.  
*Hab.* India; China; Borneo; Java; Malacca; Siam.
5. S. CAPITATA, *Guér. Voy. Coq.* p. 248, ♂; *Burm. Mon. Scol.* p. 20. 13; *Smith, Cat. Hym. Ins.* iii. 114. 137; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 47. 23.  
*S. ruficeps*, *Smith, Cat. Hym. Ins.* iii. 111. 126, ♀.  
*Hab.* Philippines.
6. S. CINCTA, *Smith, Proc. Linn. Soc.* ii. 89. 7, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 45. 19.  
*Hab.* Borneo; Sumatra; Sula; Java.
7. S. OPALINA, *Smith, Proc. Linn. Soc.* ii. 89. 9, ♂, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 42. 15.  
*Hab.* Borneo.

8. *SCOLIA SPECIOSA*, *Smith, Proc. Linn. Soc.* ii. 90. 10, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 44. 17.

*Hab.* Borneo.

9. *S. ALECTO*, *Smith, Proc. Linn. Soc.* iii. 10. 8; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 48. 24.

*Hab.* Celebes.

10. *S. MOROSA*, *Smith, Proc. Linn. Soc.* v. 118. 8; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 39. 9.

*Hab.* Amboyna; Kaioa; Sula.

11. *S. DUCALIS*, *Smith, Proc. Linn. Soc.* v. 118. 9, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 49. 25.

*Hab.* Kaisaa; Ceram.

12. *S. APICATA*, *Smith, Proc. Linn. Soc.* vi. 53. 6, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 46. 21.

*Hab.* Celebes.

13. *S. INTRUDENS*, *Smith, Proc. Linn. Soc.* vi. 53. 7, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 42. 14.

*Hab.* Celebes.

14. *S. BREVICORNIS*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 39. 8, ♂, ♀.

*Hab.* Java; Borneo.

15. *S. KOLLARI*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 40. 10, ♀.

*Hab.* Java.

16. *S. FORAMINATA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 40. 11, ♂.

*Hab.* Java.

17. *S. VELUTINA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 41. 13, ♂.

*Hab.* Java.

18. *S. MAGNIFICA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 44. 18, ♀.

*Hab.* Java.

19. *S. INSIGNIS*, *Saup. & Sich. Cat. Spec. Gen. Scol.* p. 47. 22, ♀.

*Hab.* India; Persia?

Div. 2. The anterior wings with two submarginal cells and one recurrent nervure.

(Subgenus *Discolia*, *Sauss. & Sich.*)

20. *S. CÆRULANS*, *St.-Farg. Hym.* iii. 526. 11; *Smith, Cat. Hym. Ins.* iii. 87. 8; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 104. 92.

*Hab.* India.

21. *SCOLIA CYANIPENNIS*, *Fabr. Syst. Piez.* p. 244. 35; *Burm. Mon. Scol.* p. 37. 59; *Smith, Cat. Hym. Ins.* iii. 90. 21; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 103. 91.  
*Hab.* Java; Ceylon.
22. *S. DECORATA*, *Burm. Mon. Scol.* p. 30. 39.  
*Hab.* Sumatra.
23. *S. ERRATICA*, *Smith, Cat. Hym. Ins.* iii. 88. 10; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 110. 103.  
*S. verticalis*, *Burm. Mon. Scol.* p. 37. 61 (nec *Fabr.*).  
*S. Westermanni*, *Sauss. Ann. Soc. Ent. Fr.* (1858), 212. 19, ♀.  
*Hab.* India; Java; Borneo; Sumatra.
24. *S. 4-PUSTULATA*, *Fabr. Syst. Piez.* p. 244. 34, ♀; *St.-Farg. Hym.* iii. 528. 16; *Burm. Mon. Scol.* p. 36. 58; *Smith, Cat. Hym. Ins.* iii. 87. 7; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 113. 108.  
*S. binotata*, *Fabr. Syst. Piez.* p. 244. 36, ♂.  
*S. bipunctata*? *Klug, Weber & Mohr, Breit.* i. 36. 32.  
*S. 6-pustulata*, *Klug, ibid.* 35. 30. var. ♂.  
*S. fasciato-punctata*, *Guér. Voy. Coq.* ii. 254, var. ♀.  
*S. fervida*, *Smith, Ann. & Mag. Nat. Hist.* iv. ser. 2. 1852; *Cat. Hym. Ins.* iii. 89. 15.  
*Hab.* India; Sumatra; Java.
25. *S. INSTABILIS*, *Smith, Cat. Hym. Ins.* iii. 88. 11.  
*Hab.* India.
26. *S. PULCHRA*, *Smith, Cat. Hym. Ins.* iii. 88. 12, ♀.  
*Hab.* India.
27. *S. SPECIFICA*, *Smith, Cat. Hym. Ins.* iii. 89. 13, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 117. 114.  
*Hab.* India.
28. *S. VIVIDA*, *Smith, Cat. Hym. Ins.* iii. 89. 14, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 123. 125.  
*Hab.* India.
29. *S. OBSCURA*, *St.-Farg. Hym.* iii. 527. 14, ♀; *Smith, Cat. Hym. Ins.* iii. 89. 16; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 113. 107.  
*Hab.* India.
30. *S. VENUSTA*, *Smith, Cat. Hym. Ins.* iii. 90. 17, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 120. 120.  
*Hab.* India.
31. *S. APICICORNIS*, *Guér. Voy. Coq.* ii. 235; *Smith, Cat. Hym. Ins.* iii. 90. 18; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 55. 32.  
*Hab.* India? Senegambia?



32. *SCOLIA CEPHALOTES*, *Burm. Mon. Scol.* p. 37. 60, ♀; *Smith, Cat. Hym. Ins.* iii. 37. 60; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 102. 90.  
*Hab.* Java; Borneo.
33. *S. FLAVOPICTA*, *Smith, Cat. Hym. Ins.* iii. 91. 22, ♀.  
*Hab.* Java.
34. *S. PERSONATA*, *Smith, Cat. Hym. Ins.* iii. 91. 23, ♂.  
*Hab.* Silhet.
35. *S. LÆVICEPS*, *Smith, Cat. Hym. Ins.* iii. 91. 24, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 118. 116.  
*Hab.* Hong Kong.
36. *S. MODESTA*, *Smith, Cat. Hym. Ins.* iii. 91. 25, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 124. 126.  
*Hab.* Philippines.
37. *S. MICANS*, *Guér. Voy. Coq.* ii. 251, ♀.  
*Hab.* Bouru.
38. *S. TERMINATA*, *Smith, Proc. Linn. Soc.* iii. 10. 1, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 124. 127.  
*Hab.* Celebes.
39. *FULVIPENNIS*, *Smith, Proc. Linn. Soc.* iii. 10. 7, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 125. 129.  
*Hab.* Celebes.
40. *S. NITIDA*, *Smith, Proc. Linn. Soc.* iii. 152. 2, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 108. 100.  
*Hab.* Aru; Bachian; Amboyna; Martabello; Bouru; Key; New Guinea; Timor.
41. *S. MINUTA*, *Smith, Proc. Linn. Soc.* iii. 11. 9, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 125. 128.  
*Hab.* Celebes.
42. *S. INSULARIS*, *Smith, Proc. Linn. Soc.* iii. 153. 4, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 107. 97.  
*Hab.* Key; Aru; Ceram.
43. *S. NIGERRIMA*, *Smith, Proc. Linn. Soc.* v. 116. 4, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105. 93.  
*Hab.* Dory (New Guinea).
44. *S. CULTA*, *Smith, Proc. Linn. Soc.* v. 117. 5, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 122. 123.  
*Hab.* Dory.
45. *S. CAPTIVA*, *Smith, Proc. Linn. Soc.* vi. 52. 1, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 107. 98.  
*Hab.* Gilolo; Sumatra.

46. *SCOLIA AMBIGUA*, *Smith, Proc. Linn. Soc.* vi. 52. 2, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 108. 99.  
*Hab.* Gilolo.
47. *S. DUBIA*, *Smith, Proc. Linn. Soc.* vii. 28. 5, ♂.  
*Hab.* Ceram.
48. *S. LARRADIFORMIS*, *Smith, Proc. Linn. Soc.* vii. 28. 6, ♀.  
*Hab.* Waigiou.
49. *S. MORATA*, *Smith, Proc. Linn. Soc.* vii. 28. 7, ♂.  
*Hab.* Mysol.
50. *S. MELANOSOMA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105.  
93, ♀.  
*Hab.* Java.
51. *S. REDTENBACHERI*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105.  
95, ♀.  
*Hab.* Java.
52. *S. CARBONARIA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 106.  
96, ♂, ♀.  
*Hab.* Java.
53. *S. MOLESTA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 111. 104,  
♂, ♀.  
*Hab.* Pulo Penang; Singapore; Java; Borneo.
54. *S. VOLLENHOVENI*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 112.  
105. ♂, ♀.  
*Hab.* Sumatra.
55. *S. BILUNATA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 115.  
109, ♂.  
*Hab.* Nepaul.
56. *S. BIOCULATA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 115.  
110, ♀.  
*Hab.* Java; Sumatra.
57. *S. SPLENDIDA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 116.  
112, ♂.  
*Hab.* India.
58. *S. NOBILIS*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 117.  
113, ♀.  
*Hab.* India.
59. *S. STIZUS*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 118. 115, ♀.  
*Hab.* Tranquebar.

60. *SCOLIA NITIDULA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 119.  
117, ♀.  
*Hab.* Java.
61. *S. INDICA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 119. 118, ♀.  
*Hab.* Bengal; Silhet.
62. *S. ELIFORMIS*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 120.  
119, ♂.  
*Hab.* India; Ceylon.
63. *S. VITTIFRONS*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 125.  
130, ♀.  
*Hab.* Siam.
64. *S. IGNITA*, *Smith, Cat. Hym. Ins.* iii. 101. 77, ♀.  
*Hab.* India.

Gen. LIACOS, *Guér.*

Div. 1. The anterior wings with three submarginal cells, the third discoidal cell petiolated.

1. *LIACOS DIMIDIATA*, *Guér. Voy. Cog.* ii. 247, ♂.  
*Scolia dimidiata*, *Burm. Mon. Scol.* p. 15. 2; *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 114. 138; *Proc. Linn. Soc.* vii. 29. 12, ♂, ♀.  
*S. Urvillii*, *St.-Farg. Hym.* iii. 503. 12, ♂; *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 112. 127.  
*S. analis*, *Fabr. Syst. Piez.* p. 245. 37?  
*Triliacos analis*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 33. 1.  
*Scolia penangensis*, *Sauss. Mél. Hym.* p. 39. 17, ♀ var.  
*Triliacos erythrosoma*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 35. 2.  
*Scolia erythrosoma*, *Burm. Mon. Scol.* p. 15. 1?; *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 133. 134?  
*Hab.* Philippines; Gilolo; Sumatra; Bachian; Mysol; Ceram; Amboyna; Bouru; Sula; Senegal.

Div. 2. The anterior wings with two submarginal cells, the third discoidal cell petiolated.

2. *L. (SCOLIA) FULGIDIPENNIS*, *Smith, Proc. Linn. Soc.* iv. 152. 3, ♀.  
*Hab.* Aru; Waigiou; Martabello.
3. *L. (DILIACOS) SICHELII*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* 36. 5, ♀.  
*Hab.* Sumatra.
4. *L. QUADRICEPS*, *Smith, Proc. Linn. Soc.* iii. 153. 5, ♀.  
*Diliacos quadriceps*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 37. 6.  
*Hab.* Aru; Bachian.

Gen. ELIS, *Fabr.*(Subgenus *Trielis*, Sauss. & Sich.)

Div. 1. The anterior wings with three submarginal cells and two recurrent nervures.

1. ELIS (SCOLIA) LITIGIOSA, *Smith, Cat. Hym. Ins.* iii. 113. 133, ♀;  
*Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 158. 164.

*Hab.* India.

2. E. (SCOLIA) ERYTHROSOMA, *Burm. Mon. Scol.* p. 15. 1; *Smith, Cat. Hym. Ins.* iii. 113. 134.

*Hab.* Sumatra.

3. E. (SCOLIA) FULVA, *Gray, Cuv. Anim. Kingd. (Griffiths)*, p. 516,  
 pl. 71. fig. 1, ♀; *Smith, Cat., et Proc. Linn. Soc.* vi. 54. 9, ♀; *Sauss.*  
*& Sich. Cat. Spec. Gen. Scol.* p. 159. 165.

*Scolia ferruginea*, *Fabr. Syst. Piez.* p. 241. 16, ♂?; *Smith, Cat. Hym. Ins.*  
 iii. 114. 139; *Sauss. & Sich. Cat. Spec. Gen. Scol.* 159. 166.

*Hab.* Ceram; Australia.

(Subgenus *Dielis*, Sauss. & Sich.)

Div. 2. The anterior wings with two submarginal cells and two recurrent nervures.

4. ELIS RUBROMACULATA, *Smith, Cat. Hym. Ins.* iii. 99. 67; *Sauss.*  
*& Sich. Cat. Spec. Gen. Scol.* p. 196. 209, ♀.

*Hab.* India.

5. E. (COLPA) PARVULA, *St.-Farg. Hym.* iii. 548. 17, ♀; *Smith, Cat. Hym. Ins.* iii. 99. 68.

*Hab.* India.

6. E. (SCOLIA) EXIMIA, *Smith, Cat. Hym. Ins.* iii. 99. 69, ♀; *Sauss.*  
*& Sich. Cat. Spec. Gen. Scol.* p. 195. 208.

*Hab.* India.

7. E. (SCOLIA) HABROCOMA, *Smith, Cat. Hym. Ins.* iii. 100. 71, ♀;  
*Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 198. 212.

*Hab.* India.

8. E. (SCOLIA) LUCTUOSA, *Smith, Cat. Hym. Ins.* iii. 101. 78, ♀; *Sauss.*  
*& Sich. Cat. Spec. Gen. Scol.* p. 194. 206.

*E. quadriguttulata*, *Sauss. Mél. Hym.* p. 58, fig. 12, ♀ (pl.).

*Hab.* Silhet.

9. E. (SCOLIA) AURULENTA, *Smith, Cat. Hym. Ins.* iii. 102. 80, ♀;  
*Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 206. 221.

*Hab.* Philippine Islands:

10. ELIS (SCOLIA) AGILIS, *Smith, Proc. Linn. Soc.* iii. 10. 6, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 203. 218.  
*Hab.* Celebes.
11. E. AZUREA, *Sauss. Ent. Zeit.* 1859, p. 267; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 185. 194, ♂.  
*Hab.* Java; Sumatra.
12. E. BICOLOR, *Sauss. Ann. Soc. Ent. Fr.* 1858, p. 233. 46, pl. 5. fig. 4, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 186. 195.  
*Hab.* Java.
13. E. (SCOLIA) MARGINELLA, *Klug, Weber & Mohr*, ii. 214. 44, ♂; *Smith, Cat. Hym. Ins.* iii. 98. 64; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 186. 196.  
*Scolia hirtella*, *Klug, Weber & Mohr*, ii. 215. 45, ♂ (var.? *Sauss. & Sich.*).  
*Hab.* India.
14. E. (CAMPSOMERIS) AUREICOLLIS, *St.-Farg. Hym.* iii. 499. 6, ♀; *Smith, Cat. Hym. Ins.* iii. 101. 79.  
*Hab.* Silhet; Ceylon; Celebes; Philippines.
15. E. (TIPHIA) THORACICA, *Fabr. Ent. Syst. Supp.* 254. 15, & *Syst. Piez.* 235. 19; *Guér. Voy. Coq.* ii. 251; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 188. 197, ♀.  
*Hab.* India; Java; Siam.
16. E. (SCOLIA) FIMBRIATA, *Burm. Mon. Scol.* p. 25. 26, ♀; *Smith, Cat. Hym. Ins.* iii. 100. 74; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 189. 198.  
*Scolia thoracica*, *Klug, Weber & Mohr, Beitr.* 33. 24, ♀ (*nec Fabr.*).  
*Campsomeris collaris*, *St.-Farg. Hym.* iii. 498. 5.  
*Hab.* Java; Floris.
17. E. ASIATICA, *Sauss. Ann. Soc. Ent. Fr.* 1858, p. 231. 34; *Ent. Zeit.* 1859, p. 266; *Cat. Spec. & Gen. Scol.* p. 190. 200, ♂, ♀.  
*Hab.* Java; India.
18. E. (SCOLIA) JAVANA, *St.-Farg. Hym.* iii. 498. 4, ♀; *Burm. Mon. Scol.* p. 22. 18; *Smith, Cat. Hym. Ins.* iii. 101. 76; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 191. 202.  
*Hab.* Java; Sumatra.
19. E. (SCOLIA) MICANS, *Guér. Voy. Coq.* ii. 251, ♀; *Smith, Cat. Hym. Ins.* iii. 92. 26; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 192. 203.  
*Hab.* Bouru.



20. *ELIS* (*SCOLIA*) *MOROSA*, *Smith, Præc. Linn. Soc.* vi. 53. 5, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 193. 204.  
*Hab.* Ceram.
21. *E. TRISTIS*, *Sauss. Ent. Zeit.* 1859, p. 265 (*nec* *Burm.*); *Cat. Spec. Gen. Scol.* p. 193. 205, ♀.  
*Hab.* Java; Borneo.
22. *E.* (*SCOLIA*) *4-GUTTULATA*, *Burm. Mon. Scol.* p. 21. 17, ♀; *Smith, Cat. Hym. Ins.* iii. 100. 73; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 195. 207.  
*Hab.* Java.
23. *E. RUBROMACULATA*, *Smith, Cat. Hym. Ins.* iii. 99. 67, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 196. 209.  
*Hab.* India; Java.
24. *E.* (*TIPHIA*) *ANNULATA*, *Fabr. Syst. Piez.* p. 234. 11, ♀; *Burm. Mon. Scol.* p. 25. 27; *Smith, Cat. Hym. Ins.* iii. 100. 72; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 196. 210.  
*Hab.* India; Java; China.
25. *E. DREWSNI*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 197. 211, ♀.  
*Hab.* Java.
26. *E. SNELLENI*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 198. 213, ♀.  
*Hab.* Sumatra.
27. *E.* (*TIPHIA*) *GROSSA*, *Fabr. Syst. Piez.* p. 232. 4, ♀; *Burm. Mon. Scol.* p. 23. 22; *Smith, Cat. Hym. Ins.* iii. 99. 70; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 199. 215.  
*Elis sericea*, *Sauss. Mél. Hym.* 63. 31, ♂.  
*Hab.* India; Java.
28. *E. HIRSUTA*, *Sauss. Ann. Soc. Ent. Fr.* 1858, 234. 47, ♀; *Cat. Spec. Gen. Scol.* p. 200. 216.  
*Hab.* Tranquebar.
29. *E.* (*COLPA*) *IRIS*, *St.-Farg. Hym.* iii. 547. 16, ♂; *Burm. Mon. Scol.* p. 26. 28, ♂, ♀; *Smith, Cat. Hym. Ins.* iii. 100. 75; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 201. 217.  
*Elis phalerata*, *Sauss. Ann. Soc. Ent. Fr.* 1858, 233. 45; *Ent. Zeit.* 1859, p. 268, ♀.  
*Hab.* Java.
30. *E.* (*CAMPSOMERIS*) *LINDENII*, *St.-Farg. Hym.* iii. 500. 8, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* vi. p. 204. 219.

*Scolia quadrifasciata*, *Fabr. Syst. Piez.* p. 242. 20? *Klug, Weber & Mohr*, i. 30. 20.

*Hab.* India; Java; Japan; China.

31. *ELIS LIMBATA*, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 206. 220, ♀.

*Hab.* Java.

### Fam. POMPILIDÆ, Leach.

#### Gen. POMPILUS, *Fabr.*

1. *POMPILUS ANALIS*, *Fabr. Syst. Piez.* p. 188. 4, ♀; *Dahlb. Hym Eur.* i. 47; *St.-Farg. Hym.* iii. 439. 35; *Smith, Proc. Linn. Soc.* v. 119. 1.

*Hab.* India; Singapore; Java; Bachian; Celebes; Aru.

2. *P. COMPTUS*, *St.-Farg. Hym.* iii. 425. 13, ♀.

*Hab.* India.

3. *P. (CALICURGUS) DORSALIS*, *St.-Farg. Hym.* iii. 407. 13, ♂, ♀.

*Hab.* Java.

4. *P. FENESTRATUS*, *Smith, Cat. Hym. Ins.* iii. 144. 128, ♀.

*Hab.* India (Bengal).

5. *P. HONESTUS*, *Smith, Cat. Hym. Ins.* iii. 144. 129, ♀.

*Hab.* India.

6. *P. MADRASPATANUS*, *Smith, Cat. Hym. Ins.* iii. 144. 130, ♀.

*Hab.* India.

7. *P. PEDUNCULATUS*, *Smith, Cat. Hym. Ins.* iii. 145. 131, ♀.

*Hab.* India.

8. *P. UNIFASCIATUS*, *Smith, Cat. Hym. Ins.* iii. 145. 133, ♀

*Hab.* India; Sumatra.

9. *P. GRAPHICUS*, *Smith, Cat. Hym. Ins.* iii. 148. 143, ♀.

*Hab.* Philippines.

10. *P. LEUCOPHÆUS*, *Smith, Proc. Linn. Soc.* ii. 92. 1, ♂.

*Hab.* Malacca.

11. *P. VAGABUNDUS*, *Smith, Proc. Linn. Soc.* ii. 92. 2, ♀.

*Hab.* Borneo.

12. *P. PULVEROSUS*, *Smith, Proc. Linn. Soc.* ii. 93. 3, ♂.

*Hab.* Borneo.

13. *P. SALTITANS*, *Smith, Proc. Linn. Soc.* iii. 11. 2, ♀.

*Hab.* Celebes.

14. *POMPILUS CONTORTUS*, *Smith, Proc. Linn. Soc.* iii. 12. 3, ♀.  
*Hab.* Celebes.
15. *P. PILIFRONS*, *Smith, Proc. Linn. Soc.* iii. 12. 4, ♀.  
*Hab.* Celebes; Flores.
16. *P. DECEPTOR*, *Smith, Proc. Linn. Soc.* iii. 12. 5, ♂.  
*Hab.* Celebes.
17. *P. DUBIUS*, *Smith, Proc. Linn. Soc.* iii. 153. 1, ♀.  
*Hab.* Aru.
18. *P. CONFORMIS*, *Smith, Proc. Linn. Soc.* v. 78. 1, ♀.  
*Hab.* Celebes.
19. *P. LIMBATUS*, *Smith, Proc. Linn. Soc.* v. 78. 2, ♂.  
*Hab.* Celebes.
20. *P. NIGRO-CÆRULEUS*, *Smith, Proc. Linn. Soc.* v. 79. 3, ♀.  
*Hab.* Celebes.
21. *P. INCERTUS*, *Smith, Proc. Linn. Soc.* v. 79. 4, ♂.  
*Hab.* Celebes.
22. *P. DEPREDATOR*, *Smith, Proc. Linn. Soc.* v. 119. 3, ♀.  
*Hab.* Bachian.
23. *P. PELETERII*, *Guér. Voy. Coq. Zool.* ii. 257, pl. 9. fig. 2.  
*Hab.* Amboyna.
24. *P. FULGIDIPENNIS*, *Smith, Proc. Linn. Soc.* v. 119. 4, ♀.  
*Hab.* Bachian.
25. *P. OPULENTUS*, *Smith, Proc. Linn. Soc.* v. 120. 5, ♀.  
*Hab.* Bachian.
26. *P. PRÆDATOR*, *Smith, Proc. Linn. Soc.* vi. 54. 1, ♀.  
*Hab.* Menado.
27. *P. RUFIFRONS*, *Smith, Proc. Linn. Soc.* vi. 54. 2, ♀.  
*Hab.* Ternate.
28. *P. BICOLOR*, *Fabr. Syst. Piez.* p. 198. 56, ♀.  
*Hab.* Ceram; Australia.
29. *P. JUCUNDUS*, *Smith, Proc. Linn. Soc.* vii. 29. 3, ♀.  
*Hab.* Mysol.
30. *P. VIGILANS*, *Smith, Proc. Linn. Soc.* vii. 29. 4, ♀.  
*Hab.* Waigiou.
31. *P. COGNATUS*, *Smith, Proc. Linn. Soc.* viii. 82. 4, ♂.  
*Hab.* Morty Island.
32. *P. ELATUS*, *Smith, Proc. Linn. Soc.* viii. 82. 5, ♀.  
*Hab.* Morty Island.

Gen. PRIOCNEMIS, *Schiödte*.

1. PRIOCNEMIS SERICOSOMA, *Smith, Cat. Hym. Ins.* iii. 146. 137, ♀;  
*Proc. Linn. Soc.* ii. 93. 4.  
*Hab.* Sumatra.
2. P. CANIFRONS, *Smith, Cat. Hym. Ins.* iii. 146. 138, ♀.  
*Hab.* Sumatra.
3. P. PEDESTRIS, *Smith, Cat. Hym. Ins.* iii. 147. 139, ♀.  
*Hab.* Sumatra.
4. P. PERPLEXUS, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 147. 140.  
*Hab.* Sumatra.
5. P. LUSCUS, *Fabr. Syst. Piez.* p. 215. 38; *Dahlb. Hym. Eur.* i.  
457, ♂, ♀.  
*Hab.* Tranquebar; Java.
6. P. WAHLBERGI, *Dahlb. Hym. Eur.* i. 458, ♂, ♀.  
*Hab.* Java.
7. P. MELLERBORGI, *Dahlb. Hym. Eur.* i. 457, ♀.  
*Hab.* Java.
8. P. OPTIMUS, *Smith, Proc. Linn. Soc.* ii. 93. 5, ♀.  
*Hab.* Singapore.
9. P. VERTICALIS, *Smith, Proc. Linn. Soc.* ii. 94. 6, ♀.  
*Hab.* Borneo; Malacca.
10. P. RUFIFRONS, *Smith, Proc. Linn. Soc.* iii. 12. 1, ♀.  
*Hab.* Celebes.
11. P. PULCHERRIMUS, *Smith, Proc. Linn. Soc.* iii. 156. 1, ♀.  
*Hab.* Aru; Mysol; Salwatty.
12. P. FERVIDUS, *Smith, Proc. Linn. Soc.* iii. 156. 2, ♀.  
*Hab.* Aru; New Guinea; Ceram; Mysol.
13. P. FLAVIPENNIS, *Smith, Proc. Linn. Soc.* v. 79. 1, ♀.  
*Hab.* Celebes; Bachian; Ceram; New Guinea.
14. P. CONFECTOR, *Smith, Proc. Linn. Soc.* v. 120. 3, ♀.  
*Hab.* Bachian; Ternate.
15. P. ADUSTUS, *Smith, Proc. Linn. Soc.* vii. 30. 4, ♂.  
*Hab.* Mysol.

Gen. AGENIA, *Schiödte*.

1. AGENIA (POMPILUS) BLANDA, *Guér. Voy. Coq.* ii. 260, ♀; *Smith, Proc. Linn. Soc.* ii. 94. 7.  
*Hab.* India; Malacca; Borneo; Celebes; Ceram; Key; Flores.
2. A. (POMPILUS) TINCTA, *Smith, Cat. Hym. Ins.* iii. 145. 152, ♀.  
*Hab.* India.

3. *AGENIA (POMPIUS) CÆRULEA*, *Smith, Cat. Hym. Ins.* iii. 147.  
141, ♀.  
*Hab.* India.
4. *A. VARIPES*, *Dahlb. Hym. Eur.* i. 455. 7, ♀.  
*Hab.* Java.
5. *A. ATALANTA*, *Smith, Proc. Linn. Soc.* ii. 94. 8, ♂.  
*Hab.* Borneo; Singapore; Malacca; Bachian; Celebes.
6. *A. ÆGINA*, *Smith, Proc. Linn. Soc.* ii. 94. 9, ♀.  
*Hab.* Borneo.
7. *A. DAPHNE*, *Smith, Proc. Linn. Soc.* ii. 95. 10, ♀.  
*Hab.* Borneo.
8. *A. LAVERNA*, *Smith, Proc. Linn. Soc.* ii. 95. 11, ♂.  
*Hab.* Borneo.
9. *A. MELAMPUS*, *Smith, Proc. Linn. Soc.* ii. 95. 12, ♂.  
*Hab.* Borneo.
10. *A. FLAVO-PICTA*, *Smith, Proc. Linn. Soc.* ii. 96. 13, ♀.  
*Hab.* Singapore.
11. *A. HIPPOLYTE*, *Smith, Proc. Linn. Soc.* ii. 96. 14, ♀.  
*Hab.* Singapore.
12. *A. CELÆNO*, *Smith, Proc. Linn. Soc.* ii. 96. 15, ♀.  
*Hab.* Singapore.
13. *A. BIMACULATA*, *Smith, Proc. Linn. Soc.* iii. 13. 2, ♀.  
*Hab.* Celebes.
14. *A. CALLISTO*, *Smith, Proc. Linn. Soc.* iii. 154. 2, ♀.  
*Hab.* Aru.
15. *A. JUCUNDA*, *Smith, Proc. Linn. Soc.* iii. 154. 3, ♀.  
*Hab.* Aru.
16. *A. ALTHEA*, *Smith, Proc. Linn. Soc.* iii. 154. 4, ♀.  
*Hab.* Aru.
17. *A. ALCYONE*, *Smith, Proc. Linn. Soc.* iii. 155. 5, ♂.  
*Hab.* Aru.
18. *A. AMALTHEA*, *Smith, Proc. Linn. Soc.* iii. 155. 6, ♀.  
*Hab.* Aru; Salwatty.
19. *A. HONESTA*, *Smith, Proc. Linn. Soc.* v. 80. 2, ♀.  
*Hab.* Celebes.
20. *A. ASSIMILIS*, *Smith, Proc. Linn. Soc.* v. 80. 3, ♀.  
*Hab.* Celebes.
21. *A. NITDIVENTRIS*, *Smith, Proc. Linn. Soc.* v. 80. 4, ♀.  
*Hab.* Celebes.



22. *A. AGENIA AGITATA*, *Smith, Proc. Linn. Soc.* v. 81. 5, ♀.  
*Hab.* Celebes.
23. *A. GRACILIPES*, *Smith, Proc. Linn. Soc.* v. 81. 6, ♂.  
*Hab.* Celebes.
24. *A. INGENUA*, *Smith, Proc. Linn. Soc.* v. 81. 7, ♀.  
*Hab.* Celebes.
25. *A. FACILIS*, *Smith, Proc. Linn. Soc.* v. 81. 8, ♀.  
*Hab.* Celebes.
26. *A. NASUTA*, *Smith, Proc. Linn. Soc.* v. 82. 9, ♀.  
*Hab.* Celebes.
27. *A. HILARIS*, *Smith*.  
*A. jucunda*, *Smith, Proc. Linn. Soc.* v. 82. 11, ♀, *nec jucunda*, *P. L. S.*  
 iii. 154. 3.  
*Hab.* Celebes.
28. *A. LUCILLA*, *Smith, Proc. Linn. Soc.* v. 120. 3, ♀.  
*Hab.* Aru; Gilolo; Amboyna.
29. *A. EUDORA*, *Smith, Proc. Linn. Soc.* vii. 30. 3, ♀.  
*Hab.* Mysol.
30. *A. NUMERIA*, *Smith, Proc. Linn. Soc.* vii. 31. 4, ♀.  
*Hab.* Mysol; Morty Island.
31. *A. METELLA*, *Smith, Proc. Linn. Soc.* vii. 31. 5, ♀.  
*Hab.* Mysol.
32. *A. VESTA*, *Smith, Proc. Linn. Soc.* vii. 31. 6, ♀.  
*Hab.* Mysol.
33. *A. CLAVATA*, *Smith, Proc. Linn. Soc.* vii. 31. 7, ♂.  
*Hab.* Waigiou.
34. *A. PANDORA*, *Smith, Proc. Linn. Soc.* viii. 82. 3, ♀.  
*Hab.* New Guinea.

Gen. FERREOLA, *St.-Farg.*

1. *FERREOLA FENESTRATA*, *Smith, Cat. Hym. Ins.* iii. 169. 9, ♀.  
*Hab.* India (Madras).

Gen. MACROMERIS, *St.-Farg.*

1. *MACROMERIS VIOLACEA*, *Smith, Proc. Linn. Soc.* ii. 97. 1, ♂, ♀  
 (*nec splendida*).  
*Hab.* India; China; Malacca; Borneo; Gilolo; New Guinea; Celebes; Ceram; Key; Aru; Java; Floris.
2. *M. ARGENTIFRONS*, *Smith, Proc. Linn. Soc.* ii. 97. 2, ♂, ♀.  
*Hab.* Borneo.

3. *MACROMERIS IRIDIPENNIS*, *Smith, Proc. Linn. Soc.* iv. 156. 1, ♂, ♀.  
*Hab.* Aru.

Gen. *SALIUS*, *Fabr.*

1. *SALIUS MALIGNUS*, *Smith, Proc. Linn. Soc.* iv. 157. 1.  
*Hab.* Aru; Mysol.

Gen. *MYGNIMIA*, *Shuck.*

1. *MYGNIMIA* (*SPHEX*) *FLAVA*, *Drury, Ill. Exot. Ins.* iii. tab. 42.  
 fig. 4, ♀; *Smith, Cat. Hym. Ins.* iii. 182. 2; *Proc. Linn. Soc.* ii. 1.  
*Pompilus flavus*, *Fabr. Syst. Piez.* p. 197. 52; *St.-Farg. Hym.* iii.  
 430. 21.  
*Hemipepsis flavus*, *Dahlb. Hym. Eur.* i. 123.  
*Hab.* India; Borneo; Singapore; Gilolo; Sumatra.
2. *M. AUREOSERICEA*, *Guér. Voy. Coq.* ii. 256, ♀; *Smith, Cat. Hym.*  
*Ins.* iii. 182. 3.  
*Hab.* Java.
3. *M. AUDAX*, *Smith, Cat. Hym. Ins.* iii. 182. 4, ♀.  
*Hab.* Silhet.
4. *M. ANTHRACINA*, *Smith, Cat. Hym. Ins.* iii. 183. 5, ♂.  
*Hab.* Malacca; Borneo; Singapore; Sumatra.
5. *M. ALBIPLAGIATA*, *Smith, Cat. Hym. Ins.* iii. 183. 6, ♀.  
*Hab.* Java.
6. *M. ÆRUGINOSA*, *Smith, Cat. Hym. Ins.* iii. 184. 8, ♀.  
*Hab.* Sumatra.
7. *M. FENESTRATA*, *Smith, Cat. Hym. Ins.* iii. 184. 10, ♂.  
*Hab.* Silhet.
8. *M. PERPLEXA*, *Smith, Cat. Hym. Ins.* iii. 185. 11, ♀.  
*Hab.* Madras.
9. *M. (PEPSIS) FLAVICORNIS*, *Fabr. Syst. Piez.* p. 216. 44.  
*Hab.* Malabar.
10. *M. DUCALIS*, *Smith, Proc. Linn. Soc.* ii. 98. 3, ♀.  
*Hab.* Malacca; Sumatra.
11. *M. PRINCEPS*, *Smith, Proc. Linn. Soc.* ii. 98. 4, ♀.  
*Hab.* Borneo.
12. *M. IRIDIPENNIS*, *Smith, Proc. Linn. Soc.* ii. 98. 5, ♀.  
*Hab.* Malacca; Borneo; Ceram; Timor.
13. *M. FUMIPENNIS*, *Smith, Proc. Linn. Soc.* iii. 13. 2, ♀.  
*Hab.* Celebes.

14. MYGNIMIA ASPASIA, *Smith, Proc. Linn. Soc.* iii. 157. 1, ♀.  
*Hab.* Aru; Mysol; Amboyna; Martabello.
15. M. FERVIDA, *Smith, Proc. Linn. Soc.* v. 82. 1, ♀.  
*Hab.* Celebes; New Guinea.
16. M. (POMPILUS) ICHNEUMONIFORMIS, *Guér. Voy. Coq.* v. 258.  
*Hab.* New Guinea; Amboyna; Celebes.
17. M. FERRUGINEA, *Smith, Proc. Linn. Soc.* v. 121. 3, ♀.  
*Hab.* New Guinea.
18. M. LACÆNA, *Smith, Proc. Linn. Soc.* v. 121. 4, ♀.  
*Hab.* Amboyna; Sumatra.
19. M. THIONE, *Smith, Proc. Linn. Soc.* v. 121. 5, ♀.  
*Hab.* Amboyna.
20. M. COGNATA, *Smith, Proc. Linn. Soc.* vi. 55. 3, ♀.  
*Hab.* Ternate.
21. M. INTREPIDA, *Smith, Proc. Linn. Soc.* vii. 32. 4, ♀.  
*Hab.* Timor.
22. M. OPULENTA, *Smith, Proc. Linn. Soc.* vii. 32. 5, ♂.  
*Hab.* Mysol.
23. M. EXASPERATA, *Smith, Proc. Linn. Soc.* vii. 32. 6, ♀.  
*Hab.* Mysol.

#### Gen. CEROPALES, *Latr.*

1. CEROPALES FLAVO-PICTA, *Smith, Cat. Hym. Ins.* iii. 178. 5, ♂.  
*Hab.* India.
2. C. FUSCIPENNIS, *Smith, Cat. Hym. Ins.* iii. 179. 6, ♀.  
*Hab.* India.
3. C. ORNATA, *Smith, Cat. Hym. Ins.* iii. 179. 7, ♀.  
*Hab.* India.

#### Gen. PEPSIS, *Fabr.*

1. PEPSIS DISELENE, *Smith, Cat. Hym. Ins.* iii. 200. 51, ♂.  
*Hab.* India; Singapore.

#### Gen. AMMOPHILA, *Kirby.*

1. AMMOPHILA (SPHEX) ERYTHROCEPHALA, *Fabr. Ent. Syst.* ii. 204. 23, ♀; *St.-Farg. Hym.* iii. 385. 26; *Smith, Cat. Hym. Ins.* iv. 216. 41.  
*Pelopœus erythrocephalus, Fabr. Syst. Piez.* p. 203. 2.  
*Hab.* India.
2. A. BASALIS, *Smith, Cat. Hym. Ins.* iv. 214. 37, ♀.  
*Hab.* North India; Punjaub.

3. *AMMOPHILA NIGRIPES*, *Smith, Cat. Hym. Ins.* iv. 215. 38, ♂.  
*Hab.* Madras; Floris.
4. *A. LÆVIGATA*, *Smith, Cat. Hym. Ins.* iv. 215. 39.  
*Hab.* Madras; Guzerat.
5. *A. DIMIDIATA*, *Smith, Cat. Hym. Ins.* iv. 216. 40, ♀.  
*Hab.* Bombay; Madras; Bengal.
6. *A. ELEGANS*, *Smith, Cat. Hym. Ins.* iv. 216. 42, ♂, ♀.  
*Hab.* North India: Punjaub.
7. *A. ATRIPES*, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 46.  
*Hab.* India; Khandala; Sumatra; China.
8. *A. SMITHII*, *Baly, MSS.; Smith, Cat. Cat. Hym. Ins.* iv. 217.  
45, ♀.  
*Hab.* India.
9. *A. VAGABUNDA*, *Smith, Cat. Hym. Ins.* iv. 218. 47, ♀.  
*Hab.* North India; Sumatra; North China.
10. *A. INSOLATA*, *Smith, Proc. Linn. Soc.* iii. 14. 2, ♂, ♀.  
*Hab.* Celebes.

Gen. PELOPÆUS, *Latr.*

1. *PELOPÆUS MADRASPATANUS*, *Fabr. Syst. Piez.* p. 203. 3; *Dahlb. Hym. Europ.* i. 22. 3; *Smith, Cat. Hym. Ins.* iv. 231. 17.  
*Hab.* Malabar; Madras; Nepaul; Bengal.
2. *P. SOLIERI*, *St.-Farg. Hym.* iii. 318. 18, ♀.  
*Hab.* India.
3. *P. SPINOLÆ*, *St.-Farg. Hym.* iii. 307. 4, ♀.  
*Hab.* Bombay; Ceylon.
4. *P. COROMANDELICUS*, *St.-Farg. Hym.* iii. 306. 2, ♀.  
*P. fuscus*, *St.-Farg. Hym.* iii. 311. 9, ♀, var.?  
*Hab.* Coromandel; Central India.
5. *P. PICTUS*, *Smith, Cat. Hym. Ins.* iv. 231. 22, ♂.  
*Hab.* India.
6. *P. RUFOPICTUS*, *Smith, Cat. Hym. Ins.* iv. 232. 23, ♀.  
*Hab.* Celebes.
7. *P. LÆTUS*, *Smith, Cat. Hym. Ins.* iv. 229. 13, pl. vii. fig. 1, ♀.  
*Hab.* Ceram; Gilolo; Ternate; Australia.
8. *P. BENIGNUS*, *Smith, Proc. Linn. Soc.* ii. 101. 1, nec *P. javanus*,  
and vol. iii. 15, note.  
*Hab.* Borneo; Singapore; Java.

9. *PELOPÆUS FERVENS*, *Smith, Proc. Linn. Soc.* ii. 191. 2, ♀.  
*Hab.* Borneo; Java.
10. *P. INTRUDENS*, *Smith, Proc. Linn. Soc.* iii. 15. 3, ♀.  
*Hab.* Celebes.
11. *P. FLAVO-FASCIATUS*, *Smith, Proc. Linn. Soc.* iii. 15. 4, ♀.  
*P. rufo-pictus*, *Smith, var.?*  
*Hab.* Celebes.
12. *P. LABORIOSUS*, *Smith, Proc. Linn. Soc.* iii. 159. 1, ♀.  
*Hab.* Aru; Flores.
13. *P. FABRICATOR*, *Smith, Proc. Linn. Soc.* v. 123. 3, ♀.  
*Hab.* Bachian.
14. *P. UNIFASCIATUS*, *Smith, Proc. Linn. Soc.* v. 123. 4, ♀.  
*Hab.* Bachian.
15. *P. SPIRIFEX*, *Linn. Syst. Nat.* i. 942. 9.  
*Hab.* Timor; Africa; Europe.
16. *P. MURARIUS*, *Smith, Proc. Linn. Soc.* vii. 34. 4, ♀.  
*Hab.* Ceram; New Guinea.
17. *P. BILINEATUS*, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 47.  
*Hab.* India (Bombay).
18. *P. SEPARATUS*, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 47.  
*Hab.* India (Bombay).
19. *P. BENGALENSIS*, *Dahlb. Hym. Eur.* i. 433. 2; *Smith, Cat. Hym.*  
*Ins.* iv. 230. 15.  
*Hab.* India; Floris; Philippines; China; Mauritius.
20. *P. JAVANUS*, *St.-Farg. Hym.* iii. 309. 6; *Smith, Cat. Hym. Ins.*  
iv. 231. 16.  
*Hab.* Java; Malacca.

#### Gen. CHALYBION, *Dahlb.*

1. *CHALYBION BENGALENSIS*, *Dahlb. Hym. Europ.* i. 433. 2.  
*Hab.* India; Madras; Bengal; Philippines; Mauritius; Celebes; China.

#### Gen. CHLORION, *Latr.*

1. *CHLORION LOBATUM*, *Latr. Gen. Crust. et Ins.* iv. 57; *Fabr.*  
*Syst. Piez.* p. 217. 1; *Dahlb. Hym. Eur.* i. 24. 1; *St.-Farg. Hym.*  
iii. 330. 3.  
*Sphex lobata*, *Fabr. Ent. Syst.* ii. 206. 30.  
*Chlorion azureum*, *St.-Farg. Hym.* iii. 329. 1.  
*Hab.* India; China (Penang); South Africa.



2. *CHLORION SPLENDIDUM*, *Fabr. Syst. Piez.* p. 218. 5; *Smith, Ann. & Mag. Nat. Hist.* (1851), vii. 32.

*Pronceus Campbelli*, *Saund. Trans. Ent. Soc. Lond.* iii. 58, tab. v. fig. 1, ♀.

*Sphex pulchra*, *St.-Farg. Hym.* iii. 355. 31, ♂.

*Hab.* North India.

3. *C. MELASOMA*, *Smith, Cat. Hym. Ins.* iv. 238. 5, ♀.

*Hab.* India (Pondicherry).

4. *C. RUGOSUM*, *Smith, Cat. Hym. Ins.* iv. 239. 6, ♂.

*Hab.* Sumatra.

#### Gen. *SPHEX*, *Fabr.*

1. *SPHEX ARGENTATA*, *Dahlb. Hym. Eur.* i. 25. 1, ♂, ♀.

*P. albifrons*, *St.-Farg. Hym.* iii. 337. 6, ♂.

*P. argentifrons*, *St.-Farg. Hym.* iii. 337. 7, ♀.

*Hab.* Bengal; Madras; Punjaub; Sumatra; Java; New Guinea; Celebes; Ceram; Aru; Morty Island; Africa.

2. *S. VICINA*, *St.-Farg. Hym.* iii. 343. 16, ♀.

*Hab.* India.

3. *S. FABRICII*, *Dahlb. Hym. Eur.* i. 27. 11, & 438. 21, ♀.

*Hab.* India (Tranquebar).

4. *S. FERRUGINEA*, *St.-Farg. Hym.* iii. 345. 18, ♀.

*Hab.* India; Ceylon; Philippines; Salwatty.

5. *S. FLAVO-VESTITA*, *Smith, Cat. Hym. Ins.* iv. 253. 56, ♂.

*Hab.* India.

6. *S. APICALIS*, *Smith, Cat. Hym. Ins.* iv. 253. 57, ♀.

*Hab.* Sumatra.

7. *S. LINEOLA*, *St.-Farg. Hym.* iii. 253. 27, ♂.

*Hab.* Java; Sumatra; North China.

8. *S. NIGRIPES*, *Smith, Cat. Hym. Ins.* iv. 254. 59, ♀.

*Hab.* Sumatra; North China; India; Singapore; Gilolo; Celebes.

9. *S. FORMOSA*, *Smith, Cat. Hym. Ins.* iv. 254. 60, ♀.

*Hab.* Ceram.

10. *S. MAURA*, *Smith, Cat. Hym. Ins.* iv. 255. 61, ♀.

*Hab.* Celebes.

11. *S. (PEPSIS) SERICEA*, *Fabr. Syst. Piez.* 211. 19; *Dahlb. Hym. Europ.* i. 126. 7; *St.-Farg. Hym.* iii. 341. 12.

*Hab.* Java; Malacca; Borneo; Philippines; Ternate; Waigiou; Bachian; Ceram; Aru; Timor; Sumatra; Floris.

12. *S. DIABOLICUS*, *Smith, Proc. Linn. Soc.* ii. 100. 3. ♀.

*Hab.* Borneo; Bachian; Ceram; Amboyna; New Guinea.

13. *SPHEX PRÆDATOR*, *Smith, Proc. Linn. Soc.* iii. 14. 1, ♂.  
*Hab.* Celebes.
14. *S. AURIFRONS*, *Smith, Proc. Linn. Soc.* iii. 157. 3, ♀.  
*Hab.* Java ; Celebes ; Aru ; Africa.
15. *S. NITIDIVENTRIS*, *Smith, Proc. Linn. Soc.* iii. 158. 4, ♀.  
*Hab.* Aru.
16. *S. SEPICOLA*, *Smith, Proc. Linn. Soc.* iii. 158. 5, ♀.  
*Hab.* Aru.
17. *S. GRATIOSA*, *Smith, Proc. Linn. Soc.* iii. 158. 6, ♂.  
*Hab.* Aru.
18. *S. TYRANNICA*, *Smith, Proc. Linn. Soc.* v. 122. 5, ♀.  
*Hab.* Bachian ; Kaioa ; Gilolo ; Timor ; Sula.
19. *S. JACULATOR*, *Smith, Proc. Linn. Soc.* v. 122. 6, ♂.  
*Hab.* Bachian.
20. *S. MOROSA*, *Smith, Proc. Linn. Soc.* v. 122. 7, ♂.  
*Hab.* Bachian.
21. *S. VOLATILIS*, *Smith, Proc. Linn. Soc.* v. 122. 8, ♂.  
*Hab.* Bachian.
22. *S. FEROX*, *Smith, Proc. Linn. Soc.* vi. 55. 5, ♂.  
*Hab.* Amboyua ; Celebes ; Waigiou ; Floris.

Gen. *HARPACTOPUS*, *Smith*.

1. *HARPACTOPUS CRUDELIS*, *Smith, Cat. Hym. Ins.* iv. 264. 1, pl. vi.  
fig. 4, ♀.  
*Hab.* Madras.
2. *H. NIVOSUS*, *Smith, Cat. Hym. Ins.* iv. 265. 4, ♀.  
*Hab.* North India.

Gen. *PARASPHEX*, *Smith*.

1. *PARASPHEX FERVENS*, *Smith, Cat. Hym. Ins.* iv. 267. 1.  
*Pepsis fervens*, *Fabr. Syst. Piez.* p. 209. 6.  
*Enodia fervens*, *Dahlb. Hym. Europ.* i. 439. 2; *nec* *Enodia*, *Hübner, Lepidop.* (1816).  
*Priononyx fervens*, *Ericks. Faun. und Fl. Brit. Guiana*, iii. 589.  
*Pepsis pubescens*, *Fabr. Syst. Piez.* p. 212. 22.  
*Enodia canescens*, *Dahlb. Hym. Europ.* i. 28. 2.  
*Hab.* India (Madras, Bengal) ; Africa (Cape of Good Hope, Gambia, Sierra Leone).

Gen. *DOLICHURUS*, *Latr.*

1. *DOLICHURUS ABDOMINALIS*, *Smith, Proc. Linn. Soc.* v. 83. 1, ♂.  
*Hab.* Celebes.

Gen. AMPULEX, *Jur.*

1. AMPULEX (SPHEX) COMPRESSA, *Fabr. Ent. Syst.* ii. 206. 32; *Jurine, Hym.* p. 134; *St.-Farg. Encycl. Méth.* x. 450; *Hym.* iii. 325. 1; *Dahlb. Hym. Eur.* i. 29. 1.

*Chlorion compressum*, *Fabr. Syst. Piez.* p. 219. 7; *Latr. Hist. Crust. et Ins.* xiii. 294; *Westw. Trans. Ent. Soc. Lond.* (1843), iii. 227; *Cuv. Règ. Anim. Atlas, Ins.* pl. 120 bis, fig. 3.

Guêpe Ichneumon, *Réaum. Ins.* vi. 280, tab. 28. figs. 2, 3.

*Hab.* India; China; Malacca; Borneo; Singapore; Sumatra; Java; Celebes; Amboyna.

2. A. CUPREA, *Smith, Cat. Hym. Ins.* iv. 269. 3, ♂.

*Hab.* China (Hongkong).

3. A. HOSPES, *Smith, Cat. Hym. Ins.* iv. 272. 12; *Proc. Linn. Soc.* ii. 98. 1, ♀.

*Hab.* Borneo.

4. A. SMARAGDINA, *Smith, Proc. Linn. Soc.* ii. 19. 3, ♀.

*Hab.* Singapore.

5. A. INSULARIS, *Smith, Proc. Linn. Soc.* ii. 99. 4, ♀.

*Hab.* Borneo; Malacca.

6. A. REGALIS, *Smith, Proc. Linn. Soc.* v. 83. 1, ♀.

*Hab.* Celebes.

Gen. TRIROGMA, *Westw.*

1. TRIROGMA CÆRULEA, *Westw. Trans. Ent. Soc. Lond.* iii. 225, tab. 12. fig. 3, ♂; *Archiv. Ent.* ii. 66, tab. 65. fig. 4, ♀.

*Hab.* N. India; Madras; Singapore; Celebes.

2. T. PRISMATICA, *Smith, Proc. Linn. Soc.* ii. 99. 2, ♂.

*Hab.* Borneo.

Fam. LARRIDÆ, *Steph.*Gen. LARRADA, *Smith.*

1. LARRADA (SPHEX) AURULENTA, *Fabr. Mant.* i. 274. 10.

*Sphecx aurata*, *Fabr. Ent. Syst.* ii. 213. 64.

*Pompilus auratus*, *Fabr. Ent. Syst. Supp.* 250. 25.

*Liris aurata*, *Fabr. Syst. Piez.* p. 228. 3; *Dahlb. Hym. Eur.* i. 135.

*Tachytes opulenta*, *St.-Farg. Hym.* iii. 246. 7.

*Lyrops aurata*, *Guér. Icon. Rég. Anim.* iii. 440.

*Larrada aurulenta*, *Smith, Cat. Hym. Ins.* iv. 276. 6, pl. vii. fig. 5.

*Hab.* India; China; Philippines; Borneo; Sumatra; Java; Bachian; Celebes; Bouru; Africa (Cape of Good Hope and Gambia).

2. LARRADA (SPHEX) MAURA, *Fabr. Ent. Syst.* ii. 212. 55.  
*Pompilus maura, Fabr. Ent. Syst. Supp.* 247. 11.  
*Loris maura, Fabr. Syst. Piez.* p. 230. 10.  
*Hab.* India (Tranquebar).
3. L. SIMILLIMA, *Smith, Cat. Hym. Ins.* iv. 275. 5, ♀.  
*Hab.* India; Africa.
4. L. CONSPICUA, *Smith, Cat. Hym. Ins.* iv. 276. 7, ♀.  
*Hab.* India.
5. L. ARGYREA, *Smith, Cat. Hym. Ins.* iv. 276. 8, ♀.  
*Hab.* N. India.
6. L. TRISTIS, *Smith, Cat. Hym. Ins.* iv. 277. 10, ♀.  
*Hab.* Borneo.
7. L. SUBTESSELLATA, *Smith, Cat. Hym. Ins.* 277. 11, ♀.  
*Hab.* India; Sumatra; Java.
8. L. LABORIOSA, *Smith, Cat. Hym. Ins.* iv. 278. 12, ♀.  
*Hab.* Philippines.
9. L. EXILIPES, *Smith, Cat. Hym. Ins.* iv. 278. 13, ♂.  
*Hab.* N. India; Borneo.
10. L. GLABRATA, *Smith, Cat. Hym. Ins.* iv. 279. 14, ♀.  
*Hab.* Celebes.
11. L. JACULATOR, *Smith, Cat. Hym. Ins.* iv. 279. 15, ♀.  
*Hab.* N. Bengal.
12. L. CARBONARIA, *Smith, Proc. Linn. Soc.* ii. 102. 2, ♀.  
*Hab.* Singapore.
13. L. SYCORAX, *Smith, Proc. Linn. Soc.* ii. 102. 3, ♀.  
*Hab.* Borneo.
14. L. POLITA, *Smith, Proc. Linn. Soc.* ii. 102. 4, ♀.  
*Hab.* Borneo.
15. L. TISIPHONE, *Smith, Proc. Linn. Soc.* ii. 103. 5, ♀.  
*Hab.* Borneo.
16. L. ALECTO, *Smith, Proc. Linn. Soc.* ii. 103. 6, ♀.  
*Hab.* Singapore.
17. L. ÆDILIS, *Smith, Proc. Linn. Soc.* iii. 16. 3, ♀.  
*Hab.* Celebes.
18. L. AUFRIFRONS, *Smith, Proc. Linn. Soc.* iii. 16. 4, ♂.  
*Hab.* Celebes.
19. L. PERSONATA, *Smith, Proc. Linn. Soc.* iii. 16. 5, ♀.  
*Hab.* Celebes.

20. *LARRADA RUFIPES*, *Smith, Proc. Linn. Soc.* iii. 17. 6, ♂, ♀.  
*Hab.* Celebes.
21. *L. FESTINANS*, *Smith, Proc. Linn. Soc.* iii. 17. 7, ♂, ♀.  
*Hab.* Celebes.
22. *L. MODESTA*, *Smith, Proc. Linn. Soc.* iii. 159. 1, ♀.  
*Hab.* Aru; Key; Waigiou.
23. *L. DUCALIS*, *Smith, Proc. Linn. Soc.* v. 84. 1, ♀.  
*Hab.* Celebes.
24. *L. VINDEK*, *Smith, Proc. Linn. Soc.* v. 123. 3, ♀.  
*Hab.* Bachian.
25. *L. TARSATA*, *Smith, Proc. Linn. Soc.* v. 124. 4, ♀.  
*Hab.* Bachian.
26. *L. CHRYSOBAPTA*, *Smith, Proc. Linn. Soc.* vi. 56. 1, ♀.  
*Hab.* Celebes.
27. *L. FUNEREA*, *Smith, Proc. Linn. Soc.* vii. 34. 3, ♀.  
*Hab.* Waigiou.
28. *L. SABULOSA*, *Smith, Proc. Linn. Soc.* vii. 35. 4, ♀.  
*Hab.* Ceram.
29. *L. MANSUETA*, *Smith, Proc. Linn. Soc.* viii. 84. 2, ♀.  
*Hab.* New Guinea.
30. *L. MENDAX*, *Smith, Proc. Linn. Soc.* viii. 84. 3, ♀.  
*Hab.* Gilolo.

Gen. MORPHOTA, *Smith*.

1. *MORPHOTA FORMOSA*, *Smith, Proc. Linn. Soc.* iii. 17. 1, ♀.  
*Hab.* Waigiou; Celebes.

Gen. TACHYTES, *Panz.*

1. *TACHYTES TARSATUS*, *Smith, Cat. Hym. Ins.* iv. 297. 10, ♀.  
*Hab.* India.
2. *T. FERVIDUS*, *Smith, Cat. Hym. Ins.* iv. 298. 11, ♀.  
*Hab.* India.
3. *T. (CRABRO) NITIDULUS*, *Fabr. Syst. Piez.* p. 298. 12.  
*Hab.* India; Malacca; Sumatra; Celebes.
4. *T. MONETARIUS*, *Smith, Cat. Hym. Ins.* iv. 298. 13, ♀.  
*Hab.* N. India.
5. *T. MODESTUS*, *Smith, Cat. Hym. Ins.* iv. 299. 14, ♀.  
*Hab.* India.



6. *TACHYTES MOROSUS*, *Smith, Proc. Linn. Soc.* iii. 18. 1, ♀.  
*Hab.* Celebes.
7. *T. SEDULUS*, *Smith, Proc. Linn. Soc.* v. 124. 1, ♀.  
*Hab.* Kaioa.
8. *T. ARGENTATUS*, *Brullé, Expéd. Sc. de Morée*, iii. 372.  
*Hab.* Singapore; Morea; Albania.
9. *T. (LIRIS) MAURA*, *Fabr. Syst. Piez.* p. 230. 10; *Dahlb. Hym. Eur.* i. 469. 4.  
*Hab.* Tranquebar.
10. *T. (LIRIS) REPANDA*, *Fabr. Syst. Piez.* p. 231. 13; *Dahlb. Hym. Eur.* i. 470.  
*Hab.* India.

#### Gen. *ASTATA*, *Latr.*

1. *ASTATA ORIENTALIS*, *Smith, Cat. Hym. Ins.* iv. 310. 14, ♂.  
*Hab.* India.

#### Gen. *PISON*, *Spin.*

1. *PISON ARGENTATUS*, *Schuck. Trans. Ent. Soc.* ii. 79. 9, ♀.  
*Hab.* Mauritius.
2. *P. RUGOSUS*, *Smith, Cat. Hym. Ins.* iv. 313. 3, ♀.  
*Hab.* India.
3. *P. SUSPICIOSUS*, *Smith, Proc. Linn. Soc.* ii. 104. 1, ♀.  
*Hab.* Singapore.
4. *P. OBLITERATUS*, *Smith, Proc. Linn. Soc.* ii. 104. 2, ♀.  
*Hab.* Borneo.
5. *P. NITIDUS*, *Smith, Proc. Linn. Soc.* iii. 160. 1, ♀.  
*Hab.* Aru; Key; Mysol.
6. *P. PALLIDIPALPIS*, *Smith, Proc. Linn. Soc.* vii. 35. 2, ♀.  
*Hab.* Ceram.

#### Fam. *BEMBICIDÆ*, *Westw.*

##### Gen. *BEMBEX*, *Fabr.*

1. *BEMBEX LUNATA*, *Fabr. Syst. Piez.* p. 224. 10; *Dahlb. Hym. Eur.* i. 492. 33; *Smith, Cat. Hym. Ins.* iv. 328. 44.  
*Hab.* Tranquebar.
2. *B. TREPANDA*, *Dahlb. Hym. Eur.* i. 181, ♂.  
*Hab.* India; Ceylon; Celebes; Gilolo.
3. *B. SULPHURESCENS*, *Dahlb. Hym. Eur.* i. 180.  
*Hab.* India.

4. *BEMBEX MELANCHOLICA*, *Smith, Cat. Hym. Ins.* iv. 328. 47, ♀.  
*Hab.* Sumatra; China; Borneo; Singapore; Bachian; Celebes; Aru;  
 Salwatty; Morty Island.

## Fam. NYSSONIDÆ, Wesm.

Gen. *LARREA*, *Klug.*

1. *LARRA DELESSERTII*, *Guér. Icon. Règ.-Anim.* iii. 439.  
*Hab.* India (Pondicherry).  
 2. *L. VESPIFORMIS*, *Fabr. Syst. Piez.* p. 219. 1.  
*Stizus vespiformis*, *Dahlb. Hym. Eur.* i. 154; *St.-Farg. Hym.* iii.  
 297. 6.  
*Hab.* India (Madras, N. India).  
 3. *L. BLANDINA*, *Smith, Cat. Hym. Ins.* iv. 340. 12, ♂, ♀.  
*Hab.* India.  
 4. *L. FASCIATA*, *Fabr. Syst. Piez.* p. 221. 13; *Klug, Symb. Phys.* tab.  
 46. fig. 14.  
*Stizus fasciatus*, *Dahlb. Hym. Eur.* i. 153.  
*Hab.* Tranquebar; N. India; Ethiopia (Ambukol).  
 5. *L. MELANOXANTHA*, *Smith, Cat. Hym. Ins.* iv. 346. 37, ♂.  
*Hab.* India.  
 6. *L. MELLEA*, *Smith, Cat. Hym. Ins.* iv. 344. 38, ♀.  
*Hab.* India.  
 7. *L. NUBILIPENNIS*, *Smith, Cat. Hym. Ins.* iv. 347. 41, ♀.  
*Hab.* India.  
 8. *L. REVERSA*, *Smith, Cat. Hym. Ins.* iv. 349. 47, ♀.  
*Hab.* Sumatra.  
 9. *L. RUFESCENS*, *Smith, Cat. Hym. Ins.* iv. 349. 48, ♀.  
*Hab.* India (Punjaub).  
 10. *L. PRISMATICA*, *Smith, Proc. Linn. Soc.* ii. 103. 1, ♂, ♀.  
*Hab.* Borneo; Malacca; Celebes.  
 11. *L. SIMILLIMA*, *Smith, Proc. Linn. Soc.* iii. 159. 1, ♀.  
*Hab.* Aru.  
 12. *L. MODESTA*, *Smith, Proc. Linn. Soc.* v. 124. 1, ♀.  
*Hab.* Bachian.

Gen. *MYSSON*, *Latr.*

1. *MYSSON BASALIS*, *Smith, Cat. Hym. Ins.* iv. 355. 11, ♂.  
*Hab.* India.

Gen. *GORYTES*, *Latr.*

1. *GORYTES ORNATUS*, *Smith, Cat. Hym. Ins.* iv. 371. 5, ♀.  
*Hab.* India.

2. GORYTES CONSTRICTUS, *Smith, Proc. Linn. Soc.* iii. 160. 1, ♀.  
*Hab.* Aru.

3. G. VAGUS, *Smith, Proc. Linn. Soc.* iii. 161. 2, ♀.  
*Hab.* Key Island.

4. G. BASALIS, *Smith, Proc. Linn. Soc.* v. 125. 1, ♀.  
*Hab.* Amboyna.

Gen. MELLINUS, *Fabr.*

1. MELLINUS CRABRONIFORMIS, *Smith, Proc. Linn. Soc.* ii. 107.  
 1, ♀.  
*Hab.* Borneo.

Fam. CRABRONIDÆ, *Leach.*

Gen. TRYPOXYLON, *Latr.*

1. TRYPOXYLON PILEATUM, *Smith, Cat. Hym. Ins.* iv. 377. 5, ♀.  
*Hab.* Madras.

2. T. BICOLOR, *Smith, Cat. Hym. Ins.* iv. 377. 6, ♀; *Proc. Linn. Soc.*  
 ii. 105. 1.  
*Hab.* Singapore; Java.

3. T. PETIOLATUM, *Smith, Proc. Linn. Soc.* ii. 105. 2, ♀.  
*Hab.* Borneo.

4. T. COLORATUM, *Smith, Proc. Linn. Soc.* ii. 106. 3, ♂.  
*Hab.* Borneo.

5. T. EXIMIUM, *Smith, Proc. Linn. Soc.* iii. 161. 1, ♀  
*Hab.* Aru; Key; Celebes.

6. T. ELEGANTULUM, *Smith, Proc. Linn. Soc.* v. 84. 2, ♀.  
*Hab.* Celebes.

7. T. FEROX, *Smith, Proc. Linn. Soc.* v. 84. 3, ♀.  
*Hab.* Celebes.

8. T. GRACILESCENS, *Smith, Proc. Linn. Soc.* v. 84. 4, ♀.  
*Hab.* Celebes.

9. T. PROVIDUM, *Smith, Proc. Linn. Soc.* v. 125. 1, ♀.  
*Hab.* Bachian; Gilolo; New Guinea.

10. T. PLACIDUM, *Smith, Proc. Linn. Soc.* vii. 35. 1, ♀.  
*Hab.* Mysol.

11. T. GRACILLIMUM, *Smith, Proc. Linn. Soc.* vii. 35. 2, ♂.  
*Hab.* Mysol; Morty Island.

Gen. OXYBELUS, *Latr.*

1. OXYBELUS AGILIS, *Smith, Cat. Hym. Ins.* iv. 387. 25, ♂; *Proc.*  
*Linn. Soc.* iv. 18. 1.  
*Hab.* India; Celebes.

2. *OXYBELUS TRIDENTATUS*, *Smith, Cat. Hym. Ins.* iv. 387. 26, ♂.  
*Hab.* India.

3. *O. RUFICORNIS*, *Smith, Cat. Hym. Ins.* iv. 388. 27, ♀.  
*Hab.* India.

4. *O. SABULOSUS*, *Smith, Cat. Hym. Ins.* iv. 388. 28, ♀.  
*Hab.* India.

Gen. *CRABRO*, *Fabr.*

Div. 1. Abdomen petiolated.

1. *CRABRO FLAVO-PICTUS*, *Smith, Cat. Hym. Ins.* iv. 391. 4, ♀.  
*Hab.* North India.

2. *C. AGILIS*, *Smith, Proc. Linn. Soc.* iii. 18. 1, ♀.  
*Hab.* Celebes.

Div. 2. Abdomen sessile.

3. *C. FUSCIPENNIS*, *St.-Farg. Ann. Soc. Ent. Fr.* iii. 710. 11; *Hym.*  
 iii. 113. 11; *Dahlb. Hym. Europ.* i. 385. 255.  
*Hab.* India.

4. *C. INSIGNIS*, *Smith, Cat. Hym. Ins.* iv. 422. 145, ♀.  
*Hab.* India.

5. *C. ARGENTATUS*, *St.-Farg. Ann. Soc. Ent. Fr.* iii. 792. 1; *Hym.*  
 iii. 194. 1 (*Lindeni*); *Dahlb. Hym. Europ.* i. 300. 182.  
*Hab.* India.

6. *C. FAMILIARIS*, *Smith, Proc. Linn. Soc.* ii. 106. 1, ♂.  
*Hab.* Borneo.

7. *C. RUGOSUS*, *Smith, Proc. Linn. Soc.* ii. 106. 2, ♂.  
*Hab.* Borneo.

Gen. *ARPACTOPHILUS*, *Smith.*

1. *ARPACTOPHILUS BICOLOR*, *Smith, Proc. Linn. Soc.* vii. 31. 6, ♀.  
*Hab.* Mysol.

Gen. *PSEN*, *Latr.*

1. *PSEN ERRATICUS*, *Smith, Proc. Linn. Soc.* v. 85. 1, ♀.  
*Hab.* Celebes.

2. *P. PETIOLATUS*, *Smith, Proc. Linn. Soc.* vii. 37. 1, ♀.  
*Hab.* Mysol.

Fam. *CERCERIDÆ*, *Wesm.*

Gen. *CERCERIS*, *Latr.*

1. *CERCERIS BIFASCIATUS*, *Guér. Icon. Règ. Anim.* 443, tab. 71.  
 fig. 9.  
*Hab.* Bengal.

2. *CERCERIS INTERSTINCTUS*, *Fabr. Syst. Piez.* p. 306. 21; *Smith, Cat. Hym. Ins.* iv. 452. 73 a.  
*Hab.* India.
3. *C. PICTIVENTRIS*, *Dahlb. Hym. Europ.* i. 498.  
*Hab.* Java.
4. *FLAVO-PICTA*, *Smith, Cat. Hym. Ins.* iv. 451. 72, ♀.  
*Hab.* North India.
5. *C. HILARIS*, *Smith, Cat. Hym. Ins.* iv. 452. 73, ♀.  
*Hab.* North India.
6. *C. INSTABILIS*, *Smith, Cat. Hym. Ins.* iv. 452. 74, ♀.  
*Hab.* India; Celebes; China.
7. *C. MASTOGASTER*, *Smith, Cat. Hym. Ins.* iv. 453. 75, ♀.  
*Hab.* Madras.
8. *C. ORIENTALIS*, *Smith, Cat. Hym. Ins.* iv. 454. 76, ♀.  
*Hab.* Madras.
9. *C. VIGILANS*, *Smith, Cat. Hym. Ins.* iv. 454. 77, ♂.  
*Hab.* Madras.
10. *C. FULIGINOSA*, *Smith, Cat. Hym. Ins.* iv. 454. 79, ♀.  
*Hab.* Celebes.
11. *C. FEROX*, *Smith, Cat. Hym. Ins.* iv. 454. 80, ♀.  
*Hab.* Sumatra.
12. *C. SEPULCRALIS*, *Smith, Proc. Linn. Soc.* ii. 107. 1, ♀.  
*Hab.* Borneo; Sumatra.
13. *C. UNIFASCIATA*, *Smith, Cat. Hym. Ins.* iv. 456. 79; *Proc. Linn. Soc.* iii. 19. 2.  
*Hab.* Celebes; China.
14. *C. VARIPES*, *Smith, Cat. Hym. Ins.* iv. 19. 4, ♂.  
*Hab.* Celebes.
15. *C. PRÆDATA*, *Smith, Proc. Linn. Soc.* v. 126. 1, ♀.  
*Hab.* Bachian.
16. *C. IMMOLATOR*, *Smith, Proc. Linn. Soc.* vii. 37. 1, ♀.  
*Hab.* Waigiou.
17. *C. TUMULORUM*, *Smith, Proc. Linn. Soc.* viii. 87. 2, ♀.  
*Hab.* Gilolo.

Gen. *PHILANTHUS*, *Fabr.*

1. *PHILANTHUS NOTATULUS*, *Smith, Proc. Linn. Soc.* vi. 57. 1, ♀.  
*Hab.* Menado.
2. *P. PULCHERRIMUS*, *Smith, Cat. Hym. Ins.* iv. 469. 5, ♀.  
*Hab.* India.
3. *P. SULPHUREUS*, *Smith, Cat. Hym. Ins.* iv. 469. 6, ♂.  
*Hab.* North India.



4. *PHILANTHUS DEPRÆDATOR*, *Smith, Cat. Hym. Ins.* iv. 470. 7, ♂.  
*Hab.* India.

5. *P. BASALIS*, *Smith, Cat. Hym. Ins.* iv. 473. 17, ♀.  
*Hab.* Ceylon.

### Tribe *Diploptera*.

Fam. *EUMENIDÆ*, *Westw.*

Gen. *ZETHUS*, *Fabr.*

1. *ZETHUS CYANOPTERUS*, *Sauss. Mon. Guêpes Sol. Supp.* p. 115;  
*Smith, Cat. Vespidae*, v. 9. 1; *Proc. Linn. Soc.* iii. 19. 1.  
*Hab.* Java.

Gen. *GAYELLA*, *Sauss.*

1. *GAYELLA PULCHELLA*, *Smith, Proc. Linn. Soc.* ii. 108. 1, ♀.  
*Hab.* Borneo.

Gen. *EUMENES*, *Latr.*

1. *EUMENES AFFINISSIMA*, *Sauss. Mon. Guêpes Sol.* 37. 9, ♂; *Smith, Cat. Vespidae*, v. 21. 12.  
*Hab.* India.

2. *E. XANTHURA*, *Sauss. Mon. Guêpes Sol.* 46. 26, t. 10. f. 4, ♀;  
*Smith, Cat. Vesp.* v. 21. 13.  
*Hab.* India.

3. *E. CIRCINALIS*, *Fabr. Syst. Piez.* p. 286. 4; *Sauss. Mon. Guêpes Sol.* 47. 27, t. 10. f. 7; *Smith, Cat. Vesp.* v. 22. 14.  
*Hab.* India; Gilolo; Sumatra; Java; New Guinea; Celebes; Bouru; Kaisaa; Australia.

4. *E. CONICA*, *Fabr. Syst. Piez.* p. 285. 2; *Sauss. Mon. Guêpes Sol.* 52. 34; *Smith, Cat. Vesp.* 22. 15.  
*Hab.* India; Philippines; China.

5. *E. ESURIENS*, *Fabr. Syst. Piez.* p. 286. 7; *Sauss. Mon. Guêpes Sol.* 56. 40; *Smith, Cat. Vesp.* v. 22. 16.

*E. gracilis*, *Sauss. Mon. Guêpes Sol.* 57. 41?

*E. campaniformis*, *Sauss. Mon. Guêpes Sol.* 55. 38.

*Hab.* India; Singapore; Mysol; New Guinea; China; Africa; Persia; Australia.

6. *E. EDWARDSI*, *Sauss. Mon. Guêpes Sol.* 60. 45, t. 11. f. 4, ♀;  
*Smith, Cat. Vesp.* v. 22. 17.  
*Hab.* India.

7. *E. FLAVO-PICTA*, *Blanch. Dict. d'Hist. Nat. Hym.* ii. t. 11. f. 2, ♀;  
*Sauss. Mon. Guêpes Sol.* 65. 52, ♀; *Smith, Cat. Vesp.* v. 22. 18.

*E. arcuata*, *Westw. Ins. Ind.* 90, t. 57. f. 3.  
*Hab.* India.

8. EUMENES BLANCHARDI, *Sauss. Mon. Guêpes Sol.* 66. 53, t. 12. f. 2, ♀; *Smith, Cat. Vesp.* v. 22. 19.  
*Hab.* India.
9. E. ARCUATUS, *Fabr. Syst. Piez.* p. 287. 11; *Sauss. Mon. Guêpes Sol.* 63. 50; *Smith, Proc. Linn. Soc.* vii. 37. 2; *Cat. Vesp.* v. 29. 59.  
*Vespa arcuata*, *Fabr. Ent. Syst.* ii. 276. 83; *Oliv. Encycl. Méth.* vi. 670.  
*Sphex arcuata*, *Christ, Hym.* 312.  
*Hab.* Singapore; Siam; Key; Bachian; Waigiou; Mysol; New Guinea; Floris; Australia.
10. E. EXIGUUS, *Sauss. Mon. Guêpes Sol. Supp.* 150. 39, t. 8. f. 4, ♀; *Smith, Cat. Vesp.* v. 22. 20.  
*Hab.* India.
11. E. INDIANA, *Sauss. Mon. Guêpes Sol. Supp.* 136. 19, t. 7. f. 3, ♀; *Smith, Cat. Vesp.* 23. 21.  
*Hab.* India.
12. E. BREVIROSTRATA, *Sauss. Mon. Guêpes Sol. Supp.* 136. 18, t. 7. f. 1, ♀; *Smith, Cat. Vesp.* v. 23. 22.  
*Hab.* India.
13. E. DEPRESSA, *Sauss. Mon. Guêpes Sol. Supp.* 135. 17, ♀; *Smith, Cat. Vesp.* 23. 23.  
*Hab.* India.
14. E. QUADRISPINOSA, *Sauss. Mon. Guêpes Sol. Supp.* 134. 16, t. 7. f. 2, ♀; *Smith, Cat. Vesp.* 23. 24.  
*Hab.* India; Malacca.
15. E. SUBLÆVIS, *Smith, Cat. Vesp.* 23. 25, ♀.  
*Hab.* Borneo.
16. E. FULVIPENNIS, *Smith, Cat. Vesp.* 24. 26, ♀,  
*Hab.* Celebes.
17. E. MELANOSOMA, *Sauss. Mon. Guêpes Sol.* 61. 46, t. 12. f. 1, ♀; *Smith, Cat. Vesp.* 25. 32.  
*Hab.* Java.
18. E. CURVATA, *Sauss. Mon. Guêpes Sol. Supp.* 145. 32, t. 8. f. 1; *Smith, Cat. Vesp.* v. 25. 33.  
*Hab.* Philippines.
19. E. PYRIFORMIS, *Sauss. Mon. Guêpes Sol.* 15. 12, t. 8. f. 8, ♀.  
*Hab.* Java; Sumatra.
20. E. INCONSPICUA, *Smith, Proc. Linn. Soc.* ii. 109. 7, ♀.  
*Hab.* Borneo.
21. E. SINGULARIS, *Smith, Proc. Linn. Soc.* ii. 109. 8, ♀.  
*Hab.* Borneo.

22. *EUMENES VINDEX*, *Smith, Proc. Linn. Soc.* iii. 20. 3, ♂.  
*Hab.* Celebes.
23. *E. ARCHITECTUS*, *Smith, Proc. Linn. Soc.* iii. 20. 4, ♀.  
*Hab.* Celebes.
24. *E. FLORALIS*, *Smith, Proc. Linn. Soc.* iii. 20. 5, ♂.  
*Hab.* Celebes.
25. *E. PICTIFRONS*, *Smith, Proc. Linn. Soc.* v. 86. 2, ♀.  
*Hab.* Celebes.
26. *E. ARTIFEX*, *Smith, Proc. Linn. Soc.* v. 86. 3, ♀.  
*Hab.* Celebes.
27. *E. LABORIOSUS*, *Smith, Proc. Linn. Soc.* v. 87. 4, ♀.  
*Hab.* Celebes.
28. *E. TRICOLOR*, *Smith, Proc. Linn. Soc.* v. 87. 5, ♀.  
*Hab.* Celebes; Gilolo; Bachian; Ceram.
29. *E. MEDIANUS*, *Smith, Proc. Linn. Soc.* vii. 38. 7, ♂.  
*Hab.* Ceram.
30. *E. CONFORMIS*, *Smith, Proc. Linn. Soc.* vii. 38. 8, ♀.  
*Hab.* Ceram.
31. *E. VOLATILIS*, *Smith, Proc. Linn. Soc.* vii. 38. 9, ♀.  
*Hab.* Mysol.
32. *E. PULLATUS*, *Smith, Proc. Linn. Soc.* vii. 39. 10, ♀.  
*Hab.* Ceram.
33. *E. PERPLEXUS*, *Smith, Proc. Linn. Soc.* vii. 39. 11, ♀.  
*Hab.* Bouru.
34. *E. DILIGENS*, *Smith, Proc. Linn. Soc.* vii. 39. 12.  
*Hab.* Bouru.
35. *E. INSOLENS*, *Smith, Proc. Linn. Soc.* viii. 88. 7, ♀.  
*Hab.* Gilolo.
36. *E. QUADRATA*, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 36, ♀;  
*Proc. Linn. Soc.* ii. 109. 6.  
*Hab.* Borneo; China.
37. *E. PRASLINA*, *Guér. Voy. Coq.* ii. 267, pl. 9. fig. 7, ♀ (*arcuatus* var. ?); *Smith, Proc. Linn. Soc.* v. 126. 3; *Cat. Vesp.* v. 29. 61;  
*Sauss. Mon. Guépes Sol.* 64. 51.  
*Hab.* New Ireland (Port Praslin); Gilolo; Kaisaa; Key; Amboyna;  
Ternate.
38. *E. TINCTOR*, *Christ, Hym.* 341, t. 31. f. 1, ♀; *Sauss. Mon. Guépes Sol.* 49. 30; *Smith, Proc. Linn. Soc.* vi. 57. 1.  
*Hab.* Gilolo; Senegal; Congo; Gambia; Egypt.

39. EUMENES URVILLEI, *Sauss. Guêpes Sol.* 59. 44.  
*Hab.* Gilolo; New Guinea; Ceram.

Gen. PACHYMENES, *Sauss.*

1. PACHYMENES ELEGANS, *Smith, Proc. Linn. Soc.* v. 131. 1, ♀.  
*Hab.* Bachian; Gilolo.
2. P. VIRIDIS, *Smith, Proc. Linn. Soc.* iii. 163. 1, ♀.  
*Hab.* Aru.

Gen. MONTEZUMIA, *Sauss.*

1. MONTEZUMIA INDICA, *Sauss. Mon. Guêpes Sol. Supp.* 167. 57;  
*Smith, Proc. Linn. Soc.* iii. 19. 1; *Cat. Vesp.* v. 41. 25. 59. t. 9. f. 4, ♀.  
*Hab.* India; Celebes; Java.

Gen. RHYNCHIUM, *Spin.*

1. RHYNCHIUM NITIDULUM, *Fabr. Syst. Piez.* p. 240. 35 (Vespa);  
*Sauss. Mon. Guêpes Sol.* 105. 5, ♂, ♀; *Smith, Proc. Linn. Soc.* ii.  
 110. 4; *Cat. Vesp.* v. 43. 2.  
*Hab.* India; Borneo; Bachian; Ceram.
2. R. BENGALENSE, *Sauss. Mon. Guêpes Sol. Supp.* 176. 66, ♂; *Smith,*  
*Cat. Vesp.* v. 44. 3.  
*Hab.* India (Bengal).
3. R. ATRUM, *Sauss. Mon. Guêpes Sol.* 109. 11, ♂, ♀; *Smith, Cat.*  
*Vesp.* v. 44. 4.  
*Hab.* India; Celebes.
4. R. HÆMORRHOIDALE, *Sauss. Mon. Guêpes Sol.* 109. 12, ♂, ♀;  
*Smith, Proc. Linn. Soc.* ii. 110. 1.  
*Vespa hæmorrhoidalis*, *Fabr. Syst. Piez.* p. 259. 28; *Oliv. Encycl.*  
*Méth.* vi. 683; *Christ, Hym.* 242.  
*Rygechium sanguineum*, *Sauss. Mon. Guêpes Sol.* 110. 13, ♀.  
*Rygechium parentissimum*, *Sauss. Mon. Guêpes Sol.* 111. 14.  
*Odynerus dimidiatus*, *Guér. Voy. aux Ind. Or. de Bélanger, Zool.* 503,  
 t. 4. f. 4.  
*Hab.* India; Malacca; Singapore; New Guinea; Celebes; Ceram;  
 Floris; Africa.
5. R. BRUNNEUM, *Sauss. Mon. Guêpes Sol.* 112. 16, t. 14. f. 3, ♀;  
*Smith, Cat. Vesp.* v. 44. 7.  
*Vespa brunnea*, *Fabr. Syst. Piez.* p. 260. 33.  
*Odynerus brunneus*, *Latr. Gen. Crust. et Ins.* iv. 136, t. 14. f. 3.  
*Hab.* India.
6. R. CARNATICUM, *Sauss. Mon. Guêpes Sol.* 112. 17, ♂, ♀; *Smith,*  
*Cat. Vesp.* 44. 8.

*Vespa carnatica*, *Fabr. Syst. Piez.* p. 258. 22.

*Hab.* India (Bengal).

7. *RHYNCHIUM METALLICUM*, *Sauss. Mon. Guêpes Sol.* 114. 21, t. 114.

f. 8, ♀; *Smith, Proc. Linn. Soc.* ii. 128. 2; *Cat. Vesp.* v. 45. 9.

*Hab.* India.

8. *R. ARGENTATUM*, *Sauss. Mon. Guêpes Sol.* 115. 22, ♂, ♀; *Smith,*

*Cat. Vesp.* v. 45. 10.

*Vespa argentata*, *Fabr. Syst. Piez.* p. 260. 39.

*Hab.* India.

9. *R. MELLII*, *Sauss. Mon. Guêpes Sol.* 116. 24, ♀; *Smith, Cat. Vesp.*

v. 45. 11.

*Hab.* India; China.

10. *R. DICHOTOMUM*, *Sauss. Mon. Guêpes Sol.* 116. 25, ♂, ♀; *Smith,*

*Cat. Vesp.* v. 45. 12.

*Hab.* India.

11. *R. OBSCURUM*, *Smith, Proc. Linn. Soc.* ii. 110. 5, ♀.

*Hab.* Borneo.

12. *R. MIRABILE*, *Sauss. Mon. Guêpes Sol.* 106. 6, t. 14. fig. 5, ♀;

*Smith, Proc. Linn. Soc.* iii. 163. 1, ♂.

*Hab.* Aru; Australia; Tasmania.

13. *R. SUPERBUM*, *Sauss. Mon. Guêpes Sol.* p. 113. 18, ♀; *Smith, Proc.*

*Linn. Soc.* iii. 163. 2.

*Hab.* Aru; Australia.

14. *R. IRIDIPENNE*, *Smith, Proc. Linn. Soc.* v. 128. 3, ♀.

*Hab.* Ceram.

15. *R. RUBROPICTUM*, *Smith, Proc. Linn. Soc.* v. 128. 4, ♀ (var. hæ-

morrhoidale?).

*Hab.* Bachian.

#### Gen. ODYNERUS, *Latr.*

1. *ODYNERUS SICHELII*, *Sauss. Mon. Guêpes Sol. Supp.* 206. 94, t. 10.

f. 6, ♀; *Smith, Cat. Vesp.* v. 58. 55.

*Hab.* India.

2. *O. PUNCTUM*, *Sauss. Mon. Guêpes Sol.* 209. 114, t. 19. f. 2, ♀;

*Smith, Cat. Vesp.* 59. 57.

*Hab.* India.

3. *O. PUNCTATIPENNIS*, *Sauss. Mon. Guêpes Sol.* 210. 15, ♀; *Smith,*

*Cat. Vesp.* 59. 57.

*Hab.* India.



4. ODYNERUS OVALIS, *Sauss. Mon. Guêpes Sol.* 215. 122, t. 19. f. 4, ♂;  
*Smith, Cat. Vesp.* v. 59. 58.  
*Hab.* India; Celebes; China.
5. O. DIFFINIS, *Sauss. Mon. Guêpes Sol. Supp.* 274. 155, t. 14. f. 2, ♀;  
*Smith, Cat. Vesp.* v. 59. 59.  
*Hab.* India.
6. O. INTRICATUS, *Smith, Cat. Vesp.* v. 59. 60, ♂.  
*Hab.* India (Bombay).
7. O. FLAVO-LINEATUS, *Smith, Cat. Vesp.* v. 60. 61, ♀.  
*Hab.* Java; Malacca.
8. O. CONFLUENTUS, *Smith, Cat. Vesp.* v. 60. 62, ♂.  
*Hab.* Sumatra.
9. O. RUFESCENS, *Smith, Cat. Vesp.* v. 61. 63, ♀.  
*Hab.* Ceram.
10. O. FRAGILIS, *Smith, Cat. Vesp.* v. 61. 64, ♀.  
*Hab.* Borneo.
11. O. MANIFESTUS, *Smith, Proc. Linn. Soc.* ii. 110. 2, ♂.  
*Hab.* Borneo.
12. O. MACULIPENNIS, *Smith, Proc. Linn. Soc.* ii. 110. 4, ♀.  
*Hab.* Borneo; Gilolo; Celebes.
13. O. SEPTEMFASCIATUS, *Smith, Proc. Linn. Soc.* ii. 110. 3, ♂.  
*Hab.* Borneo.
14. O. (ANCISTROCERUS) CLAVICORNIS, *Smith, Proc. Linn. Soc.* iii.  
 21. 2, ♂.  
*Hab.* Celebes.
15. O. (LEIONOTUS) INSULARIS, *Smith, Proc. Linn. Soc.* iii. 21.  
 3, ♂.  
*Hab.* Celebes.
16. O. PETIOLATUS, *Smith, Proc. Linn. Soc.* iii. 164. 1, ♀.  
*Hab.* Aru; Celebes; New Guinea.
17. O. AGILIS, *Smith, Proc. Linn. Soc.* iii. 164. 2, ♂.  
*Hab.* Aru; Celebes; Ternate; Waigiou.
18. O. MULTIPICTUS, *Smith, Proc. Linn. Soc.* iii. 165. 3, ♀.  
*Hab.* Aru.
19. O. MODESTUS, *Smith, Proc. Linn. Soc.* iii. 165. 4, ♀.  
*Hab.* Aru.
20. O. IGNOBILIS, *Smith, Proc. Linn. Soc.* v. 87. 1, ♀.  
*Hab.* Celebes.

21. *ODYNERUS FACILIS*, *Smith, Proc. Linn. Soc.* v. 88. 2, ♂.  
*Hab.* Celebes.
22. *O. CIRCUMSPECTUS*, *Smith, Proc. Linn. Soc.* v. 88. 3, ♀ (*Ancistrocerus*).  
*Hab.* Celebes.
23. *O. PETULANS*, *Smith, Proc. Linn. Soc.* v. 89. 4, ♀.  
*Hab.* Celebes.
24. *O. FALLAX*, *Smith, Proc. Linn. Soc.* vi. 58. 2, ♀.  
*Hab.* Gilolo.
25. *O. JACULATOR*, *Smith, Proc. Linn. Soc.* vii. 40. 3 (*fallax*, *nec O. fallax, Proc. vol. vi.*).  
*Hab.* Mysol.
26. *O. CONSPICUUS*, *Smith, Proc. Linn. Soc.* vii. 40. 4, ♀.  
*Hab.* Mysol.
27. *O. SOBRINUS*, *Smith, Proc. Linn. Soc.* vii. 40. 5, ♀.  
*Hab.* Ceram.
28. *O. LABORIOSUS*, *Smith, Proc. Linn. Soc.* vii. 41. 6, ♂.  
*Hab.* Mysol.
29. *O. IMPULSUS*, *Smith, Proc. Linn. Soc.* viii. 88. 4, ♀.  
*Hab.* Morty Island.
30. *O. ORNATUS*, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 49 (*Ancistrocerus*).  
*Hab.* India (Bombay).
31. *O. GUTTATUS*, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 49 (*Ancistrocerus*).  
*Hab.* India (Khandala).

Gen. *ALASTOR*, *St.-Farg.*

1. *ALASTOR UNIFASCIATUS*, *Smith, Proc. Linn. Soc.* iii. 165. 1, ♀.  
*Hab.* Aru.
2. *A. APICATUS*, *Smith, Proc. Linn. Soc.* iii. 166. 2, ♂.  
*Hab.* Aru.

Gen. *PTEROCHILUS*, *Klug.*

1. *PTEROCHILUS EXIMIUS*, *Smith, Proc. Linn. Soc.* viii. 89. 1, ♂.  
*Hab.* New Guinea.

Fam. *VESPIDÆ*, *Steph.*

Gen. *ISCHNOGASTER*, *Guér.*

1. *ISCHNOGASTER FULGIPENNIS*, *Guér. Voy. Coq.* ii. 269; *Sauss. Ann. Soc. Ent. Fr.* 2nd ser. x. 23; *Mon. Guépes Soc.* 7. 1; *Smith, Cat. Vesp.* v. 92. 1.

*Stenogaster fulgipennis*, Guér. *Voy. Coq.* tab. 9. fig. 9.

*Hab.* New Guinea.

2. *ISCHNOGASTER MICANS*, Sauss. *Ann. Soc. Ent. Fr.* 2nd ser. x. 24 ;  
*Mon. Guêpes Soc.* 8. 2 ; *Smith, Proc. Linn. Soc.* ii. 113. 4.

*Hab.* Malacca ; Borneo ; Java.

3. *I. MELLII*, Sauss. *Ann. Soc. Ent. Fr.* 2nd ser. x. 25, t. 2. f. 1 ; *Mon.*  
*Guêpes Soc.* 9. 3 ; *Smith, Proc. Linn. Soc.* ii. 113. 2.

*Hab.* Malacca ; Java ; Borneo.

4. *I. CILIPENNIS*, *Smith, Cat. Vesp.* v. 92. 4, ♂ ; *Proc. Linn. Soc.* ii.  
113. 1.

*Hab.* Malacca ; Borneo.

5. *I. NIGRIFRONS*, *Smith, Proc. Linn. Soc.* ii. 113. 3, ♀.

*Hab.* Borneo ; Floris.

6. *I. IRIDIPENNIS*, *Smith, Proc. Linn. Soc.* iii. 166. 1, ♂.

*Hab.* Aru.

7. *I. PICTUS*, *Smith, Proc. Linn. Soc.* v. 89. 1, ♀.

*Hab.* Celebes.

8. *I. AGILIS*, *Smith, Proc. Linn. Soc.* v. 89. 2, ♂.

*Hab.* Celebes.

9. *I. AURIFRONS*, *Smith, Proc. Linn. Soc.* vi. 58. 1, ♀.

*Hab.* Celebes.

10. *I. UNICOLOR*, *Smith, Proc. Linn. Soc.* vii. 41. 2, ♂.

*Hab.* Mysol ; Waigiou.

#### Gen. *BELONOGASTER*, Sauss.

1. *BELONOGASTER INDICUS*, Sauss. *Mon. Guêpes Soc.* 17. 6.

*Hab.* India.

#### Gen. *ICARIA*, Sauss.

1. *ICARIA ARISTOCRATICA*, Sauss. *Mon. Guêpes Soc.* 37. 15, ♀ ; *Smith,*  
*Cat. Vesp.* v. 97. 20.

*Hab.* India ; Pulo Penang.

2. *I. FERRUGINEA*, Sauss. *Mon. Guêpes Soc.* 38. 17, t. 5. f. 6, ♀.

*Vespa ferruginea*, *Fabr. Ent. Syst.* ii. 280. 95.

*Polistes ferruginea*, *Fabr. Syst. Piez.* p. 277. 39.

*Hab.* India ; Malacca ; Borneo ; Celebes ; Ceram ; Floris.

3. *I. (EPIPONA) VARIEGATA*, *Smith, Ann. & Mag. Nat. Hist.* (1852)  
ix. 48 ; *Sauss. Mon. Guêpes Soc.* 237.

*Hab.* India (Poona) ; China.

4. *I. PENDULA*, *Smith, Cat. Vesp.* v. 98. 23, ♀.

*Hab.* India (Bareilly).

5. *ICARIA FORMOSA*, *Sauss. Mon. Guêpes Soc.* 37. 16, ♀; *Smith, Cat. Vesp.* 98. 24.  
*Hab.* India.
6. *I. ARTIFEX*, *Sauss. Mon. Guêpes Soc.* 25. 3, t. 4. f. 3, ♂, & p. 237, note.  
*Hab.* India; Java.
7. *I. SUMATRÆ*, *Sauss. Mon. Guêpes Soc. Append.* 244.  
*Vespa Sumatræ*, *Weber, Obs. Entom.* 103. 1.  
*Vespa mutillata*, *Illig. Mag.* i. 189. 19.  
*Polistes pubescens*, *Fabr. Syst. Piez.* 279. 49.  
*Hab.* Sumatra.
8. *I. SPECIOSA*, *Sauss. Rev. Zool.* (1855) p. 374; *Smith, Cat. Vesp.* v. 98. 27.  
*Hab.* Sumatra; Malacca; Borneo.
9. *I. OPULENTA*, *Smith, Cat. Vesp.* v. 99. 28, ♀; *Proc. Linn. Soc.* ii. 115. 2.  
*Hab.* Borneo; Malacca; Sumatra.
10. *I. FLAVO-PICTA*, *Smith, Cat. Vesp.* v. 99. 29, ♀.  
*Hab.* Borneo.
11. *I. PHILIPPINENSIS*, *Sauss. Mon. Guêpes Soc. Append.* 240. ♀;  
*Smith, Cat. Vesp.* 99. 31.  
*Hab.* Philippines.
12. *I. LEFEBVREI*, *Le Guillou, Ann. Soc. Ent. Fr.* (1841) x. 322. 21, ♀.  
*Hab.* Triton Bay.
13. *I. LUGUBRIS*, *Smith, Proc. Linn. Soc.* ii. 115. 4, ♀.  
*Hab.* Borneo.
14. *I. MODESTA*, *Smith, Proc. Linn. Soc.* ii. 115. 5, ♀.  
*Hab.* Borneo.
15. *I. PILOSA*, *Smith, Proc. Linn. Soc.* iii. 22. 2, ♂.  
*Hab.* Celebes.
16. *I. MACULIVENTRIS*, *Sauss. Mon. Guêpes Soc.* 23. 1.  
*Rhopalidia maculiventris*, *Guér. Voy. Coq.* ii. 267, pl. 9. f. 8.  
*Hab.* Aru; New Guinea; Celebes.
17. *I. NIGRA*, *Smith, Proc. Linn. Soc.* iii. 167. 2, ♀.  
*Hab.* Aru; Mysol.
18. *I. FASCIATA*, *Smith, Proc. Linn. Soc.* iii. 167. 3, ♀.  
*Hab.* Aru.

19. ICARIA BRUNNEA, *Smith, Proc. Linn. Soc.* iii. 167. 4, ♀.  
*Hab.* Aru.
20. I. GRACILIS, *Smith, Proc. Linn. Soc.* iii. 167. 5, ♀.  
*Hab.* Aru.
21. I. UNICOLOR, *Smith, Proc. Linn. Soc.* iii. 168. 6, ♀.  
*Hab.* Key Island.
22. I. MOROSA, *Smith, Proc. Linn. Soc.* vii. 42. 5, ♀.  
*Hab.* Waigiou.
23. I. IRRITATA, *Smith, Proc. Linn. Soc.* vii. 42. 6, ♀.  
*Hab.* Mysol.
24. I. TORRIDA, *Smith, Proc. Linn. Soc.* vii. 42. 7, ♀.  
*Hab.* Ceram.
25. I. CONSERVATOR, *Smith, Proc. Linn. Soc.* v. 130. 1, ♀.  
*Hab.* New Guinea.
26. I. IMPETUOSA, *Smith, Proc. Linn. Soc.* v. 131. 2, ♀.  
*Hab.* Bachian; Amboyna; Ceram.
27. I. DECEPTOR, *Smith, Proc. Linn. Soc.* vii. 42. 8, ♀.  
*Hab.* Mysol.
28. I. PICTA, *Sauss. Mon. Guêpes Soc.* 238, ♂, ♀.  
*Hab.* Bengal.

#### Gen. POLISTES, *Latr.*

1. POLISTES HEBRÆUS, *Sauss. Mon. Guêpes Soc.* 53. 10, pl. 7. f. 1, ♀;  
*Smith, Cat. Vesp.* v. 101. 5.  
*Vespa hebræa*, *Fabr. Ent. Syst.* ii. 274. 74; *Oliv. Encycl. Méth.* vi. 690.  
105.  
*Polistes hebræa*, *Fabr. Syst. Piez.* p. 273. 21; *St.-Farg. Hym.* i.  
525. 12.  
*Polistes Macaensis*, *Fabr. Syst. Piez.* p. 272. 12; *Westw. Ins. Ind.* 91,  
t. 57. f. 4.  
*Vespa undata*, *Oliv. Encycl. Méth.* vi. 684. 72.  
*Hab.* India; China; Isle of France; Persia.
2. P. ORIENTALIS, *Kirby, Introd. Ent.* ed. 1, iii. 633, ♂ (*Cyclostoma*),  
ed. 5, p. 631 (*Gyrostoma*).  
*Hab.* India; China.
3. P. CONFUSUS, *Smith, Cat. Vesp.* v. 102. 7.  
*P. orientalis*, *St.-Farg. Hym.* i. 519. 1, ♂.  
*P. schach*, *Sauss. Mon. Guêpes Soc.* 50. 3.  
*Hab.* India; China.



4. *POLISTES HOPLITES*, *Sauss. Mon. Guêpes Soc.* p. 55. 11, ♀, & p. 255; *Smith, Cat. Vesp.* 102. 8.

*Hab.* India.

5. *P. STIGMA*, *Fabr. Syst. Piez.* p. 261. 41; *Sauss. Mon. Guêpes Soc.* 64. 21, ♀, t. 6. f. 3; *Smith, Cat. Vesp.* 102. 9.

*Vespa tamula*, *Fabr. Ent. Syst. Supp.* 263. 78.

*Polistes tamula*, *Fabr. Syst. Piez.* p. 261. 41.

*Hab.* India; Mysol; Celebes; Aru; Ceram; Sumatra.

6. *P. SAGITTARIUS*, *Sauss. Mon. Guêpes Soc.* 56. 12, ♀; *Smith, Proc. Linn. Soc.* ii. 113. 1; *Cat. Vesp.* 102. 10.

*Hab.* Borneo; India; China; Greece; Celebes; Sumatra.

7. *P. TENEBRICOSUS*, *St.-Farg. Hym.* i. 529. 17; *Sauss. Mon. Guêpes Soc.* 51. 5, ♀; *Smith, Cat. Vesp.* 103. 11.

*Hab.* Java.

8. *P. MACULIPENNIS*, *Sauss. Mon. Guêpes Soc.* 61. 19, t. 6. f. 4, ♂.

*Hab.* Java.

9. *P. DIABOLICUS*, *Sauss. Mon. Guêpes Soc.* 68. 26, t. 6. f. 7, ♀; *Smith, Cat. Vesp.* v. 103. 13.

*Hab.* Java; Ceram; Amboyna; Timor; Aru; New Guinea; Floris.

10. *P. CALLIMORPHUS*, *Sauss. Mon. Guêpes Soc.* 71. 31, & p. 255, ♀, ♂, t. 10. f. 1.; *Smith, Cat. Vesp.* v. 103. 14.

*Hab.* Timor.

11. *P. LATERITIUS*, *Smith, Cat. Vesp.* v. 103. 15, ♂, ♀.

*Hab.* Ceram.

12. *P. PHILIPPINENSIS*, *Sauss. Mon. Guêpes Soc.* 58. 14, ♀; *Smith, Cat. Vesp.* v. 104. 19.

*Hab.* Philippines; Celebes; Floris.

13. *P. MANILLENSIS*, *Sauss. Mon. Guêpes Soc.* 70. 30, ♂; *Smith, Cat. Vesp.* v. 104. 20.

*Hab.* Philippines.

14. *P. PICTELI*, *Sauss. Mon. Guêpes Soc.* 69. 28, t. 6. f. 8, ♀; *Smith, Proc. Linn. Soc.* iii. 22. 2; *Cat. Vesp.* 106. 34.

*Hab.* Ceram; Australia.

15. *P. FASTIDIOSUS*, *Sauss. Mon. Guêpes Soc.* 60. 18, ♂; *Smith, Cat. Vesp.* v. 104. 23.

*Hab.* New Guinea; Mysol; Celebes; Africa.

16. *P. TEPIDUS*, *Fabr. Syst. Piez.* p. 271. 7; *Sauss. Mon. Guêpes Soc.* 68. 27, pl. 8. f. 1, ♀; *Smith, Cat. Vesp.* 106. 33.

*Vespa tepida*, *Christ, Hym.* 242; *Fabr. Ent. Syst.* ii. 262. 31.

*Hab.* Java; Waigiou; Bachian; Key; Aru; New Guinea; Solomon Islands; Gilolo; Morty Island; Australia.

17. *POLISTES NIGRIFRONS*, *Smith, Proc. Linn. Soc.* iii. 168. 4, ♀.

*Hab.* Aru; Salwatty.

18. *P. ELEGANS*, *Smith, Proc. Linn. Soc.* iii. 169. 5, ♀.

*Hab.* Aru; Key.

19. *P. COLONICUS*, *Smith, Proc. Linn. Soc.* v. 129. 3, ♂.

*Hab.* Amboyna.

20. *P. SIMULATUS*, *Smith, Proc. Linn. Soc.* v. 130. 4, ♀.

*Hab.* Kaioa; Bachian; Morty Island.

21. *P. MULTIPICTUS*, *Smith, Proc. Linn. Soc.* v. 130. 5, ♀.

*Hab.* Amboyna; Gilolo; Bachian; Morty Island.

22. *P. SMITHII*, *Sauss. Mon. Guêpes Soc.* 60. 17, t. 7. f. 3; *Smith, Cat. Vesp.* v. 104. 24.

*Hab.* Mysol; Gambia; Sierra Leone.

#### GEN. *VESPA*, *Linn.*

1. *VESPA ORIENTALIS*, *Linn. Syst. Nat. Mant.* p. 540; *Fabr. Syst. Piez.* p. 254. 4; *Oliv. Encycl. Méth.* vi. 677. 41; *Christ, Hym.* p. 237; *St.-Farg. Hym.* i. 507. 5; *Ménétr. Mém. de l'Acad. Imp. des Sc. de St.-Pétersb.* vi. 304. 976; *Sauss. Mon. Guêpes Soc.* 132. 11; *Smith, Cat. Vesp.* v. 117. 10.

*V. turcica*, *Drury, Illustr. Exot. Ins.* ii. t. 39. f. 1.

*V. fusca*, *Christ, Hym.* 216.

*V. ægyptiaca*, *Vallot, Tabl. de Réaum.* 170.

*V. nilotica*, *Vallot, Tabl. de Réaum.* 170; *Savigny, Descr. de l'Egypte, Hym.* pl. 8. f. 1.

*Hab.* India; China; Egypt; Europe.

2. *V. CINCTA*, *Fabr. Syst. Piez.* p. 254. 6; *Oliv. Encycl. Méth.* vi. 676. 37; *Christ, Hym.* 219; *St.-Farg. Hym.* i. 505. 1; *Sauss. Mon. Guêpes Soc.* 152. 37; *Smith, Proc. Linn. Soc.* ii. 116. 1; *Cat. Vesp.* v. 118. 12.

*Sphex tropica*, *Sulz. Hist. Ins.* t. 27. f. 5.

*Vespa unifasciata*, *Oliv. Encycl. Méth.* vi. 677. 39.

*V. tenebrionis*, *Christ*, 216.

*Hab.* India; China; Malacca; Borneo; Java.

3. *V. AFFINIS*, *Fabr. Syst. Piez.* p. 254. 2 (var. *V. cincta*?); *Oliv. Encycl. Méth.* vi. 677. 38; *St.-Farg. Hym.* i. 506. 2; *Sauss. Mon. Guêpes Soc.* 154. 39; *Smith, Proc. Linn. Soc.* ii. 116. 2.

*Hab.* India; Malacca; Singapore; Gilolo; Java; Bachian; Celebes; Mysol; New Guinea; Ceram; Amboyna; Sula; Morty Island.

4. *V. ANALIS*, *Fabr. Syst. Piez.* p. 254. 6; *Christ, Hym.* 218. t. 18.

- f. 5; *Oliv. Encycl. Méth.* vi. 677. 43; *St.-Farg. Hym.* i. 508. 6; *Sauss. Mon. Guêpes Soc.* 152. 36; *Smith, Cat. Hym. Ins.* v. 118. 14.  
*Crabro sphinx*, *Christ*, 217, t. 18. f. 5.  
*Hab.* India.
5. *VESPA BICOLOR*, *Fabr. Syst. Piez.* p. 257. 15; *Oliv. Encycl. Méth.* vi. 680. 53; *St. Farg. Hym.* i. 512. 10; *Sauss. Mon. Guêpes Soc.* 143. 25; *Smith, Cat. Vesp.* 118. 16.  
*Hab.* India; China.
6. *V. VELUTINA*, *St.-Farg. Hym.* i. 507. 4, ♀; *Sauss. Mon. Guêpes Soc.* 144. 26, ♂, ♀; *Smith, Cat. Hym. Ins.* v. 19. 16.  
*Hab.* India; Java; Floris; China.
7. *V. AURARIA*, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 46, t. 8. f. 8; *Sauss. Mon. Guêpes Soc.* 147. 29.  
*Hab.* North India.
8. *V. OBLITERATA*, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 47; *Sauss. Mon. Guêpes Soc.* 149. 32.  
*Hab.* North India.
9. *V. BASALIS*, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 46; *Sauss. Mon. Guêpes Soc.* 148. 31.  
*Hab.* India; Nepaul.
10. *V. MAGNIFICA*, *Smith, Trans. Ent. Soc. Lond.* new ser. i. 45; *Sauss. Mon. Guêpes Soc.* 155. 40. t. 13. f. 3, ♀.  
*Hab.* India (Nepaul).
11. *V. TYRANNICA*, *Smith, Cat. Vesp.* v. 119. 21, ♂; *Proc. Linn. Soc.* ii. 116. 3.  
*Hab.* Singapore.
12. *V. DORYLLOIDES*, *Sauss. Mon. Guêpes Soc. Supp.* 256.  
*V. anomala*, *Sauss. Mon. Guêpes Soc.* 112. 1, t. 14. f. 2; *Smith, Proc. Linn. Soc.* ii. 116. 4.  
*Hab.* India; Malacca; Borneo; Singapore; Sumatra; Java.
13. *V. ALDUINI*, *Guér. Voy. Coq.* t. 9. f. 5.  
*V. bimaculata*, *Guér. Voy. Coq.* 264.  
*V. Alduini*, *Sauss. Mon. Guêpes Soc.* 154. 38 (var. *cincta*?); *Smith, Proc. Linn. Soc.* vii. 43. 2; *Cat. Hym. Ins.* v. 120. 23.  
*Hab.* Java; Ceram.
14. *V. BELLICOSA*, *Sauss. Mon. Guêpes Soc.* 146. 28, pl. xiv. f. 10, ♀; *Smith, Proc. Linn. Soc.* ii. 116. 5; *Cat. Vesp.* v. 120. 24.  
*Hab.* Java; Borneo.
15. *V. CRABRONIFORMIS*, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 40, ♂; *Sauss. Mon. Guêpes Soc.* 145. 27.  
*Hab.* China; India.

16. *VESPA DUCALIS*, *Smith, Trans. Ent. Soc. Lond. new ser. ii. 39*,  
♀, ♂; *Sauss. Mon. Guêpes Soc. 151. 35.*  
*Hab.* North India; North China.
17. *V. NIGRIPENNIS*, *Sauss. Mon. Guêpes Soc. 156. 41*, ♂; *Smith,*  
*Cat. Vesp. v. 121. 28.*  
*Hab.* Philippines.
18. *V. DEUSTA*, *St.-Farg. Hym. i. 506. 3*, ♀; *Sauss. Mon. Guêpes*  
*Soc. 149. 33*; *Smith, Cat. Vesp. v. 121. 29.*  
*Hab.* Philippines.
19. *V. LUCTUOSA*, *Sauss. Mon. Guêpes Soc. 143. 24*, ♂; *Smith, Cat.*  
*Vesp. v. 121. 30.*  
*Hab.* Philippines.
20. *V. PHILIPPINENSIS*, *Sauss. Mon. Guêpes Soc. 148. 30*, ♂; *Smith,*  
*Proc. Linn. Soc. v. 131. 2.*  
*Hab.* Philippines; Celebes; Amboyna.
21. *V. FERVIDA*, *Smith, Proc. Linn. Soc. iii. 23. 2*, ♀, ♂.  
*Hab.* Celebes.
22. *V. ANNULATA*, *Smith, Proc. Linn. Soc. ii. 116. 6*, ♂.  
*Hab.* Borneo; Malacca.
23. *V. UNICOLOR*, *Smith, Proc. Linn. Soc. vii. 44. 4*, ♀.  
*Hab.* Bouru.

*Gen. POLYBIA, Sauss.*

1. *POLYBIA SUMATRENSIS*, *Sauss. Guér. Rev. Mag. Zool. (1855)*  
*p. 374.*  
*Hab.* Sumatra.
2. *P. STIGMA*, *Smith, Proc. Linn. Soc. ii. 114. 2*, ♂.  
*Hab.* Borneo.
3. *P. LUCTUOSA*, *Smith, Proc. Linn. Soc. ii. 114. 3*, ♀.  
*Hab.* Borneo.
4. *P. DECORATA*, *Smith, Proc. Linn. Soc. ii. 114. 4*, ♀.  
*Hab.* Borneo.
5. *P. ARTIFEX*, *Smith, Proc. Linn. Soc. v. 90. 1*, ♀.  
*Hab.* Celebes.
6. *P. MATHEMATICA*, *Smith, Proc. Linn. Soc. v. 90. 2*, ♀.  
*Hab.* Celebes.
7. *P. LIMATULA*, *Smith, Proc. Linn. Soc. vii. 43*, ♀.  
*Hab.* Mysol.

Tribe **Anthophila**, Latr.Fam. **ANDRENIDÆ**, Leach.Gen. **PROSOPIS**, Fabr.

1. **PROSOPIS MALACHISIS**, *Smith, Proc. Linn. Soc.* iii. 132. 1, ♀.  
*Hab.* Key Island.
2. **P. EXIMIUS**, *Smith, Proc. Linn. Soc.* v. 131. 1, ♀.  
*Hab.* Bachian; Gilolo.
3. **P. APICATA**, *Smith, Proc. Linn. Soc.* vii. 44. 1, ♀.  
*Hab.* Mysol.
4. **P. LUSORIA**, *Smith, Proc. Linn. Soc.* vii. 44. 2, ♀.  
*Hab.* Mysol.
5. **P. IMPERIALIS**, *Smith, Proc. Linn. Soc.* vii. 44. 3, ♀.  
*Hab.* New Guinea.
6. **P. MONILICORNIS**, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863)  
p. 24. 245.  
*Hab.* Ceylon.
7. **P. ELEGANS**, *Smith, Proc. Linn. Soc.* viii. 91. 1, ♀.  
*Hab.* New Guinea.
8. **P. MIXTUS**, *Smith, Ann. & Mag. Nat. Hist.* (1852), ix. 50.  
*Hab.* India.

Gen. **SPHECODES**, Latr.

1. **SPHECODES INSULARIS**, *Smith, Proc. Linn. Soc.* iii. 5. 1, ♂.  
*Hab.* Celebes.

Gen. **NOMIA**, Latr.

1. **NOMIA CRASSIPES**, *Latr. Gen. Crust. et Ins.* iv. 155; *Smith, Cat. Andren. & Ap.* 90. 15.  
*Eucera crassipes*, *Fabr. Syst. Piez.* p. 384. 10, ♂.  
*Hab.* India (Tranquebar).
2. **N. CURVIPES**, *Oliv. Encycl. Méth.* viii. 377. 6, ♂; *Smith, Cat. Andren. & Ap.* 90. 16.  
*Hab.* India (Tranquebar).
3. **N. STRIGATA**, *St.-Farg. Hym.* ii. 291. 1; *Smith, Cat. Andren. & Ap.* 90. 18.  
*Megilla strigata*, *Fabr. Syst. Piez.* p. 331. 10.  
*Hab.* India; Java.
4. **N. APICALIS**, *Smith, Proc. Linn. Soc.* ii. 43. 1, ♂.  
*Hab.* Singapore.
5. **N. IRIDESCENS**, *Smith, Proc. Linn. Soc.* ii. 43. 2, ♀.  
*Hab.* India; Malacca; Bouru.



6. *NOMIA PUNCTATA*, *Smith, Proc. Linn. Soc.* iii. 5. 1, ♂.  
*Hab.* Celebes.
7. *N. FLAVIPES*, *Smith, Proc. Linn. Soc.* iii. 5. 2, ♀.  
*Hab.* Celebes.
8. *N. FORMOSA*, *Smith, Proc. Linn. Soc.* iii. 5. 3, ♀, ♂.  
*Hab.* Celebes; Bachian.
9. *N. HALICTOIDES*, *Smith, Proc. Linn. Soc.* iii. 6. 4, ♀.  
*Hab.* Celebes; Ceram.
10. *N. CINCTA*, *Smith, Proc. Linn. Soc.* iii. 132. 1, ♀.  
*Hab.* Key Island; Bachian.
11. *N. LONGICORNIS*, *Smith, Proc. Linn. Soc.* iii. 133. 2, ♂.  
*Hab.* Aru; Bachian; Mysol.
12. *N. DENTATA*, *Smith, Proc. Linn. Soc.* iii. 133. 3, ♂, ♀.  
*Hab.* Aru; Bachian; Mysol; New Guinea.
13. *N. CONCINNA*, *Smith, Proc. Linn. Soc.* v. 91. 1, ♂, ♀.  
*Hab.* Celebes; Ceram.
14. *N. CLAVATA*, *Smith, Proc. Linn. Soc.* vi. 59. 1, ♂.  
*Hab.* Gilolo; Morty Island.
15. *N. MODESTA*, *Smith, Proc. Linn. Soc.* vi. 59. 2, ♀.  
*Hab.* Gilolo.
16. *N. BIDENTATA*, *Smith, Proc. Linn. Soc.* vii. 45. 4, ♂.  
*Hab.* Mysol; New Guinea.
17. *N. FLOREA*, *Smith, Proc. Linn. Soc.* vii. 45. 5, ♂.  
*Hab.* Mysol.
18. *N. METALLICA*, *Smith, Proc. Linn. Soc.* vii. 45. 6, ♀.  
*Hab.* Waigiou.
19. *N. SIMILLIMA*, *Smith, Proc. Linn. Soc.* vii. 46. 7, ♀.  
*Hab.* Ceram.
20. *N. OPULENTA*, *Smith, Proc. Linn. Soc.* viii. 91. 3, ♂.  
*Hab.* Morty Island.
21. *N. ELEGANS*, *Smith, Proc. Linn. Soc.* ii. 44. 3, ♀.  
*Hab.* Malacca; Bouru.

Gen. *HALICTUS*, *Latr.*

1. *HALICTUS PROPINQUUS*, *Smith, Cat. Andren. & Ap.* 60. 78, ♂.  
*Hab.* North India.
2. *H. AGRESTIS*, *Smith, Cat. Andren. & Ap.* 61. 79 ♀.  
*Hab.* North India.
3. *H. ALBESCENS*, *Smith, Cat. Andren. & Ap.* 61. 80, ♂, ♀.  
*Hab.* North India.

4. *HALICTUS RUGOLATUS*, *Smith, Cat. Andren. & Ap.* 62. 81, ♀.  
*Hab.* North India.

5. *H. LUCIDIPENNIS*, *Smith, Cat. Andren. & Ap.* 62. 82, ♀.  
*Hab.* North India.

6. *H. XANTHOGNATUS*, *Smith, Cat. Andren. & Ap.* 62. 83, ♂.  
*Hab.* North India.

7. *H. FIMBRIATUS*, *Smith, Cat. Andren. & Ap.* 63. 84, ♂.  
*Hab.* North India.

8. *H. CONSTRICTUS*, *Smith, Cat. Andren. & Ap.* 63. 85, ♂.  
*Hab.* North India.

9. *H. CERATINUS*, *Smith, Proc. Linn. Soc.* ii. 42. 1, ♂.  
*Hab.* Borneo.

10. *H. VAGANS*, *Smith, Proc. Linn. Soc.* ii. 42. 2, ♀.  
*Hab.* Borneo.

11. *H. BASALIS*, *Smith, Proc. Linn. Soc.* ii. 42. 3, ♂.  
*Hab.* Singapore.

12. *H. FRATERNUS*, *Smith, Proc. Linn. Soc.* v. 91. 1, ♀.  
*Hab.* Celebes.

Gen. CTENOPLECTRA, *Smith.*

1. *CTENOPLECTRA CHALYBEA*, *Smith, Proc. Linn. Soc.* ii. 45. 1, ♀.  
*Hab.* Malacca; Celebes.

Fam. APIDÆ Auct.

Gen. MEGACHILE, *Latr.*

1. *MEGACHILE LANATA*, *St.-Farg. Hym.* ii. 342. 15; *Smith, Cat. Andren. & Ap.* 177. 97.

*Anthophora lanata*, *Fabr. Syst. Piez.* p. 372. 1.  
*Hab.* India.

2. *M. DISJUNCTA*, *St.-Farg. Hym.* ii. 331. 3; *Smith, Cat. Andren. & Ap.* 178. 98.

*Anthophora disjuncta*, *Fabr. Syst. Piez.* p. 374. 10.  
*Hab.* India; Mauritius.

3. *M. RUFIVENTRIS*, *Guér. Voy. Ind. Orient. (Belang.)*, p. 502, t. 4. f. 5; *Smith, Cat. Andren. & Ap.* 178. 99.  
*Hab.* India; Mauritius.

4. *M. FRATERNA*, *Smith, Cat. Andren. & Ap.* 178. 100.  
*Hab.* India.

5. *M. MONTICOLA*, *Smith, Cat. Andren. & Ap.* 179. 101, ♀.  
*Hab.* Silhet; North China.

6. *MEGACHILE CARBONARIA*, *Smith, Cat. Andren. & Ap.* 179. 102, ♂.  
*Hab.* North India.
7. *M. CEPHALOTES*, *Smith, Cat. Andren. & Ap.* 179. 103, ♀.  
*Hab.* North India.
8. *M. ALBIFRONS*, *Smith, Cat. Andren. & Ap.* 180. 104, ♀, ♂.  
*Hab.* North India.
9. *M. VELUTINA*, *Smith, Cat. Andren. & Ap.* 180. 105, ♀.  
*Hab.* North India.
10. *M. FASCICULATA*, *Smith, Cat. Andren. & Ap.* 180. 106, ♂.  
*Hab.* North India.
11. *M. BICOLOR*, *St.-Farg. Hym.* ii. 342. 15; *Smith, Andren. & Ap.*  
181. 107.  
*Anthophora bicolor*, *Fabr. Syst. Piez.* p. 373. 3.  
*Hab.* India; China.
12. *M. ORNATA*, *Smith, Cat. Andren. & Ap.* 183. 114, ♀.  
*Hab.* Nepaul; Borneo.
13. *M. THORACICA*, *Smith, Cat. Andren. & Ap.* 182. 110, ♀.  
*Hab.* Java.
14. *M. OPPOSITA*, *Smith, Cat. Andren. & Ap.* 182. 111, ♀.  
*Hab.* Java.
15. *M. ATRATA*, *Smith, Cat. Andren. & Ap.* 182. 112, ♀.  
*Hab.* Philippines; Borneo; Malacca.
16. *M. LATICEPS*, *Smith, Cat. Andren. & Ap.* 183. 113, ♂.  
*Hab.* Philippines.
17. *M. DIMIDIATA*, *Smith, Cat. Andren. & Ap.* 174. 88, ♀.  
*Hab.* India.
18. *M. ANTHRACINA*, *Smith, Cat. Andren. & Ap.* 175. 89, ♀.  
*Hab.* India.
19. *M. CONJUNCTA*, *Smith, Cat. Andren. & Ap.* 175. 90, ♂, ♀.  
*Hab.* India.
20. *M. UMBRIPENNIS*, *Smith, Cat. Andren. & Ap.* 175. 91, ♀.  
*Hab.* Nepaul; Borneo.
21. *M. FULVO-VESTITA*, *Smith, Cat. Andren. & Ap.* 176. 92, ♀, ♂.  
*Hab.* Bombay.
22. *M. VESTITA*, *Smith, Cat. Andren. & Ap.* 176. 93, ♀.  
*Hab.* India.
23. *M. RUFIPES*, *Smith, Cat. Andren. & Ap.* 177. 94, ♂.  
*Hab.* India.

24. *MEGACHILE IMITATRIX*, *Smith, Cat. Andren. & Ap.* 177. 95, ♀.  
*Hab.* India.
25. *M. AMPUTATA*, *Smith, Proc. Linn. Soc.* ii. 45. 4, ♀.  
*Hab.* Borneo.
26. *M. TUBERCULATA*, *Smith, Proc. Linn. Soc.* ii. 46. 5, ♀.  
*Hab.* Borneo.
27. *M. ARCHITECTA*, *Smith, Proc. Linn. Soc.* ii. 46. 6, ♀.  
*Hab.* Borneo.
28. *M. LUCTUOSA*, *Smith, Proc. Linn. Soc.* ii. 46. 7, ♀.  
*Hab.* Singapore.
29. *M. ROTUNDICEPS*, *Smith, Proc. Linn. Soc.* ii. 47. 8, ♀.  
*Hab.* Malacca.
30. *M. INCISA*, *Smith, Proc. Linn. Soc.* iii. 6. 1, ♂.  
*Hab.* Celebes.
31. *M. FULVIFRONS*, *Smith, Proc. Linn. Soc.* iii. 6. 2, ♀.  
*Hab.* Celebes; Timor.
32. *M. TERMINALIS*, *Smith, Proc. Linn. Soc.* iii. 7. 3, ♀.  
*Hab.* Celebes.
33. *M. LATERITIA*, *Smith, Proc. Linn. Soc.* iii. 134. 1, ♀.  
*Hab.* Aru.
34. *M. SCABROSA*, *Smith, Proc. Linn. Soc.* iii. 134. 2, ♀.  
*Hab.* Aru; Bouru.
35. *M. INSULARIS*, *Smith, Proc. Linn. Soc.* iii. 134. 3, ♀.  
*Hab.* Aru.
36. *M. PLUTO*, *Smith, Proc. Linn. Soc.* v. 133. 1, ♀.  
*Hab.* Bachian.
37. *M. LACHESIS*, *Smith, Proc. Linn. Soc.* v. 133. 2, ♀.  
*Hab.* Bachian; Amboyna; Ternate; Mysol; Bouru.
38. *M. CLOTHO*, *Smith, Proc. Linn. Soc.* v. 134. 3, ♀.  
*Hab.* Bachian; Gilolo.
39. *M. ALECTO*, *Smith, Proc. Linn. Soc.* v. 134. 4, ♂.  
*Hab.* New Guinea; Gilolo; Ternate; Mysol.
40. *M. FOLIATA*, *Smith, Proc. Linn. Soc.* v. 134. 5, ♀.  
*Hab.* Bachian.
41. *M. VENTRALIS*, *Smith, Proc. Linn. Soc.* v. 134. 6, ♀.  
*Hab.* Amboyna.
42. *M. ATERRIMA*, *Smith, Proc. Linn. Soc.* vi. 60. 4, ♀.  
*Hab.* Celebes.
43. *M. PLACIDA*, *Smith, Proc. Linn. Soc.* vi. 60. 5, ♂.  
*Hab.* Gilolo; Ternate; Mysol.

44. MEGACHILE LABORIOSA, *Smith, Proc. Linn. Soc.* vi. 60. 6, ♂.  
*Hab.* Ternate.

45. M. FUNERARIA, *Smith, Proc. Linn. Soc.* vii. 46. 6, ♀.  
*Hab.* Bouru.

46. M. NIDULATOR, *Smith, Proc. Linn. Soc.* viii. 92. 4, ♀.  
*Hab.* New Guinea.

47. M. SENEX, *Smith, Proc. Linn. Soc.* viii. 92. 5, ♀.  
*Hab.* New Guinea.

48. M. APICATA, *Smith, Proc. Linn. Soc.* viii. 93. 6, ♂.  
*Hab.* Morty Island.

Gen. LITHURGUS, *Latr.*

1. LITHURGUS ATRATUS, *Smith, Cat. Andren. & Ap.* 145. 7, ♀.  
*Hab.* India.

Gen. CHALICODOMA, *St.-Farg.*

1. CHALICODOMA SEMIVESTITA, *Smith, Cat. Andren. & Ap.* 168.  
 5, ♂.  
*Hab.* India.

Gen. CROCISA, *Jurine.*

1. CROCISA NITIDULA, *Fabr. Syst. Piez.* p. 386. 2 (Melecta); *Latr. Gen. Crust. et Ins.* iv. 172; *St.-Farg. Hym.* ii. 448. 1.  
*Crocisa pulchella*, *Guér. Icon. Règ. Anim.* 454. t. 74.  
*Hab.* Amboyna; Gilolo; Ternate; Mysol; Celebes; Key; Floris;  
 Aru; Australia.
2. C. HISTRIO, *Latr. Gen. Crust. et Ins.* iv. 172; *St.-Farg. Hym.* ii.  
 454. 9; *Lucas, Hist. Nat. des Ins.* iii. 411; *Eversm. Bull. Mosc.* xxv.  
 104. 1; *Smith, Cat. Ap.* 276. 1.  
*Melecta histrio*, *Fabr. Syst. Piez.* p. 385. 1.  
*Hab.* India; Europe; Algeria.
3. CROCISA EMARGINATA, *St.-Farg. Hym.* ii. 449. 3; *Smith, Proc. Linn. Soc.* vi. 61. 2.  
*Hab.* Ternate; Port Praslin.

Gen. ALLODAPE, *St.-Farg.*

1. ALLODAPE MARGINATA, *Smith, Cat. Ap.* 230. 7, ♀.  
*Hab.* India.
2. A. NITIDA, *Smith, Proc. Linn. Soc.* iii. 134. 1, ♀.  
*Hab.* Aru.

Gen. NOMADA, *Fabr.*

1. NOMADA SOLITARIA, *Smith, Cat. Ap.* 243. 57, ♂.  
*Hab.* N. India.



2. *NOMADA LUSCA*, *Smith, Cat. Ap.* 243. 58, ♀.

*Hab.* Philippines.

3. *N. DECORATA*, *Smith, Cat. Ap.* 243. 59, ♀.

*Hab.* North India.

4. *N. BIPUNCTATA*, *Fabr. Syst. Piez.* p. 392. 8; *St.-Farg. Encycl. Méth.* viii. 369. 20.

*Hab.* India.

5. *N. INSULARIS*, *Smith, Proc. Linn. Soc.* vii. 47. 1, ♀.

*Hab.* Ceram.

6. *N. CONSPICUA*, *Smith, Proc. Linn. Soc.* vii. 47. 2, ♂.

*Hab.* Timor.

Gen. *CÆLIOXYS*, *Latr.*

1. *CÆLIOXYS INTRUDENS*, *Smith, Proc. Linn. Soc.* v. 92. 1, ♀.

*Hab.* Bachian; Bouru.

2. *C. FULVIFRONS*, *Smith, Proc. Linn. Soc.* iii. 7. 2, ♂.

*Hab.* Celebes.

Gen. *STELIS*, *Panz.*

1. *STELIS ABDOMINALIS*, *Smith, Proc. Linn. Soc.* iii. 7. 1, ♂.

*Hab.* Celebes.

Gen. *CERATINA*, *Latr.*

1. *CERATINA VIRIDIS*, *Guér. Icon. Règ. Anim.* 444, t. 73. f. 6; *Smith, Cat. Andren. & Ap.* 224. 9.

*Hab.* Bengal; Ceylon; China; Celebes.

2. *C. PICTA*, *Smith, Cat. Andren. & Ap.* 224. 10, ♀.

*Hab.* Ceylon.

3. *C. SIMILLIMA*, *Smith, Cat. Andren. & Ap.* 225. 11, ♂.

*Hab.* India.

4. *C. HIEROGLYPHICA*, *Smith, Cat. Andren. & Ap.* 226. 13, ♀.

*Hab.* North India; China; Philippines; Borneo; Celebes.

5. *C. MACULATA*, *Smith, Cat. Andren. & Ap.* 226. 14, ♂.

*Hab.* Java.

6. *C. SMARAGDINA*, *Smith, Cat. Andren. & Ap.* 226. 15, ♀.

*Hab.* Java.

7. *C. FLAVOPICTA*, *Smith, Proc. Linn. Soc.* ii. 47. 2, ♀.

*Hab.* Borneo.

8. *C. PICTIFRONS*, *Smith, Proc. Linn. Soc.* v. 92. 1, ♀.

*Hab.* Celebes.

Gen. *TETRALONIA*, *Spin.*

1. *TETRALONIA FLORALIA*, *Smith, Cat. Ap.* 302. 32, ♂.

*Hab.* India.

Gen. SAROPODA, *Latr.*

1. SAROPODA BOMBIFORMIS, *Smith, Cat. Ap.* 318. 6, ♀; *Proc. Linn. Soc.* iii. 135. 1.

*Hab.* Aru; Australia.

Gen. ANTHOPHORA, *Latr.*

1. ANTHOPHORA ZONATA, *Linn. Syst. Nat.* i. 955. 19 (Apis); *St.-Farg. Hym.* ii. 25. 1; *Smith, Cat. Ap.* 336. 90.

*Myilla zonata, Fabr. Syst. Piez.* p. 331. 13.

*Hab.* India; China; Philippines; Malacca; Borneo; Gilolo; Sumatra; Java; Waigiou; Bachian; New Guinea; Mysol; Celebes; Key; Aru; Australia.

2. A. SUBCÆRULEA, *St.-Farg. Hym.* ii. 30. 4, ♂, ♀; *Smith, Cat. Ap.* 336. 91.

*Hab.* India.

3. A. NIVEO-CINCTA, *Smith, Cat. Ap.* 337. 92, ♀.

*Hab.* India.

4. A. FASCIATA, *Fabr. Syst. Piez.* p. 331. 12; *Smith, Cat. Ap.* 337. 93.

*Hab.* India.

5. A. CONFUSA, *Smith, Cat. Ap.* 337. 94, ♀.

*Hab.* India.

6. A. BICINCTA, *St.-Farg. Hym.* ii. 34. 9; *Smith, Cat. Ap.* 338. 95.

*Centris bicincta, Fabr. Syst. Piez.* p. 358. 16.

*Hab.* India.

7. ANTHOPHORA INSULARIS, *Smith, Proc. Linn. Soc.* ii. 48. 2, ♀.

*Hab.* Borneo.

8. A. ELEGANS, *Smith, Proc. Linn. Soc.* iii. 135. 2, ♀.

*Hab.* Ceram; Amboyna; Australia.

9. A. VIGILANS, *Smith, Proc. Linn. Soc.* v. 92. 1, ♀.

*Hab.* Celebes.

Gen. XYLOCOPA, *Latr.*

1. XYLOCOPA LATIPES, *Fabr. Syst. Piez.* p. 337. 1; *St.-Farg. Hym.* ii. 203. 51; *Smith, Cat. Ap.* 353. 43.

*Apis latipes, Drury, Ill. Exot. Ins.* ii. 98, t. 48. f. 2, ♂; *Fabr. Ent. Syst.* ii. 314. 1.

*Platynopoda latipes, Westw. Nat. Libr.* xxxviii. 271, t. 23. f. 1.

*Apis gigas, De Geer, Ins.* iii. 28. f. 15; *Christ, Hym.* tab. 4. f. 1, ♀, 2, ♂.

*Hab.* India; Ceylon; Philippines; China; Sumatra; Java; Borneo; Singapore.

2. X. LUNATA, *Klug, Mag. der Gesell. Nat. Fr. zu Berlin* (1807), t. 7. f. 2.

*Hab.* Tranquebar.

3. *X. INDICA*, *Klug, Mag. der Gesell. Nat. Fr. zu Berlin* (1807), t. 7. f. 2.  
*Hab.* Tranquebar.
4. *X. VERTICALIS*, *St.-Farg. Hym.* ii. 195. 38; *Smith Cat. Ap.* 352. 39.  
*Hab.* India; Singapore; Celebes; Timor.
5. *X. VIRIDIPENNIS*, *St.-Farg. Hym.* ii. 205. 54.  
*Hab.* India; Philippines.
6. *X. TENUISCAPA*, *Westw. Nat. Libr.* xxxviii. 271, t. 23. f. 2, ♂; *St.-Farg. Hym.* ii. 203. 51, ♂, ♀; *Smith, Cat. Ap.* 353. 43.  
*Hab.* India; Ceylon.
7. *X. RUFICORNIS*, *Fabr. Syst. Piez.* p. 341. 12; *Smith, Cat. Ap.* 353. 42.  
*Hab.* India.
8. *X. IRIDIPENNIS*, *St.-Farg. Hym.* ii. 188. 23; *Smith, Cat. Ap.* 353. 44.  
*Hab.* India.
9. *X. FERRUGINEA*, *St.-Farg. Hym.* ii. 187. 22; *Smith, Cat. Ap.* 353. 45.  
*Hab.* India.
10. *X. FENESTRATA*, *Fabr. Syst. Piez.* p. 339. 6; *St.-Farg. Hym.* ii. 184. 15; *Smith, Cat. Ap.* 353. 46.  
*Hab.* India; Mysol.
11. *X. COLLARIS*, *St.-Farg. Hym.* ii. 189. 26; *Smith, Cat. Ap.* 353. 47.  
*Hab.* India; Sumatra; Malacca; Borneo; Celebes.
12. *X. OLIVIERI*, *St.-Farg. Hym.* ii. 192. 34.  
*Hab.* India; Bagdad.
13. *X. (APIS) ÆSTUANS*, *Linn. Syst. Nat.* i. 961. 53, ♀; *Fabr. Ent. Syst.* ii. 323. 41; *St.-Farg. Hym.* ii. 193. 36.  
*Apis leucothorax*, *De Geer, Ins.* iii. 573. 4, t. 28. f. 7.  
*Bombus æstuans*, *Fabr. Syst. Piez.* p. 351. 44.  
*Hab.* India; China; Malacca; Borneo; Sumatra; Java; Celebes; Aru; Timor; Australia.
14. *X. ORICHALCEA*, *St.-Farg. Hym.* ii. 181. 10.  
*Hab.* India; China.
15. *X. FLAVONIGRESCENS*, *Smith, Cat. Ap.* 354. 52, ♂.  
*Hab.* Silhet.
16. *X. ACUTIPENNIS*, *Smith, Cat. Ap.* 355. 53, ♂.  
*Hab.* Silhet.

17. *XYLOCOPA BASALIS*, *Smith, Cat. Ap.* 355. 54, ♂, ♀.  
*Hab.* North India.
18. *X. AURIPENNIS*, *St.-Farg. Hym.* ii. 181. 10.  
*Hab.* India; China.
19. *X. DISSIMILIS*, *St.-Farg. Hym.* ii. 180. 9, ♀, ♂.  
*X. lunulata*, *St.-Farg. Hym.* ii. 184. 14, var., ♂.  
*Hab.* India; China; Borneo; Philippines; Floris.
20. *X. CÆRULEA*, *St.-Farg. Hym.* ii. 200. 46; *Smith, Proc. Linn. Soc.* ii. 48. 5.  
*Hab.* India; China; Singapore; Java.
21. *X. DEJEANII*, *St.-Farg. Hym.* ii. 209. 59; *Smith, Cat. Ap.* 357. 62.  
*Hab.* Java; Borneo; Sumatra; Celebes.
22. *X. MARGINELLA*, *St.-Farg. Hym.* ii. 205. 53; *Smith, Cat. Ap.* 357. 63.  
*Hab.* Java.
23. *X. MESOXANTHA*, *St.-Farg. Hym.* ii. 199. 45; *Smith, Cat. Ap.* 357. 64.  
*Hab.* Java.
24. *X. PHILIPPINENSIS*, *Smith, Cat. Ap.* 357. 65, ♀.  
*Hab.* Philippines.
25. *X. DIMIDIATA*, *St.-Farg. Hym.* 199. 44; *Smith, Cat. Ap.* 357. 66.  
*Hab.* Timor; Australia.
26. *X. INSULARIS*, *Smith, Proc. Linn. Soc.* ii. 48. 1, ♂.  
*Hab.* Borneo.
27. *X. NOBILIS*, *Smith, Proc. Linn. Soc.* iii. 8. 5, ♀.  
*Hab.* Celebes.
28. *X. CORONATA*, *Smith, Proc. Linn. Soc.* v. 135. 1, ♀.  
*Hab.* Kaioa.
29. *X. UNICOLOR*, *Smith, Proc. Linn. Soc.* v. 135. 2, ♂, ♀.  
*Hab.* Amboyna.
30. *X. VOLATILIS*, *Smith, Proc. Linn. Soc.* vi. 61. 2, ♂.  
*Hab.* Celebes.
31. *X. DIVERSIPES*, *Smith, Proc. Linn. Soc.* vi. 61. 3, ♂.  
*Hab.* Celebes.
32. *X. PERFORATA*, *Smith, Proc. Linn. Soc.* vi. 61. 4, ♀.  
*Hab.* Ternate.
33. *X. PROVIDA*, *Smith, Proc. Linn. Soc.* vii. 48. 4, ♂, ♀.  
*Hab.* Mysol; Waigiou.

Gen. BOMBUS, *Latr.*

1. BOMBUS RUFIPES, *St.-Farg. Hym. i. 473. 25; Smith, Cat. Ap. 401. 66.*  
*Hab.* Java.
2. B. TUNICATUS, *Smith, Trans. Ent. Soc. ii. new ser. 43, t. 8. f. 7, ♀.*  
*Hab.* North India; N. China.
3. B. RUFOFASCIATUS, *Smith, Trans. Ent. Soc. ii. new ser. 48, ♀.*  
*Hab.* North India.
4. B. ORIENTALIS, *Smith, Cat. Ap. 402. 71, ♀.*  
*Hab.* India.
5. B. HÆMORRHOIDALIS, *Smith, Trans. Ent. Soc. ii. new ser. 43.*  
*Hab.* India.
6. B. FUNERARIUS, *Smith, Trans. Ent. Soc. ii. new ser. 47, t. 8. f. 6, ♀.*  
*Hab.* North India.
7. B. EXIMIUS, *Smith, Trans. Ent. Soc. ii. new ser. 47, t. 8. f. 5, ♀.*  
*Hab.* Silhet.
8. BOMBUS SIMILIS, *Smith, Trans. Ent. Soc. ii. new ser. p. 48.*  
*Hab.* N. India.

Gen. TRIGONA, *Jurine.*

1. TRIGONA-VIDUA, *St.-Farg. Hym. i. 429. 24.*  
*Hab.* India; Timor.
2. T. VENTRALIS, *Smith, Proc. Linn. Soc. ii. 50. 1, ♀.*  
*Hab.* Borneo; Malacca.
3. T. ATRIPES, *Smith, Proc. Linn. Soc. ii. 50. 2, ♀.*  
*Hab.* Malacca.
4. T. THORACICA, *Smith, Proc. Linn. Soc. ii. 50. 3, ♀.*  
*Hab.* Singapore.
5. T. NITIDIVENTRIS, *Smith, Proc. Linn. Soc. ii. 50. 4, ♀.*  
*Hab.* Malacca.
6. T. APICALIS, *Smith, Proc. Linn. Soc. ii. 51. 6, ♀.*  
*Hab.* Borneo.
7. T. LÆVICEPS, *Smith, Proc. Linn. Soc. ii. 51. 5, ♀.*  
*Hab.* Singapore.
8. T. CANIFRONS, *Smith, Proc. Linn. Soc. ii. 51. 7, ♀.*  
*Hab.* Borneo.



9. *T. COLLINA*, *Smith, Proc. Linn. Soc.* ii. 51. 8, ♀.  
*Hab.* Malacca.
10. *T. FIMBRIATA*, *Smith, Proc. Linn. Soc.* ii. 52. 9, ♀.  
*Hab.* Singapore.
11. *T. PLANIFRONS*, *Smith, Proc. Linn. Soc.* viii. 93. 2, ♀.  
*Hab.* New Guinea.
12. *T. ATRICORNIS*, *Smith, Proc. Linn. Soc.* viii. 94. 3, ♀.  
*Hab.* New Guinea..

Gen. *APIS* *Auct.*

1. *APIS DORSATA*, *Fabr. Ent. Syst.* ii. 328. 64; *PSyst. uez.* p. 370. 7;  
*St.-Farg. Hym.* i. 405. 9; *Smith, Cat. Hym. Ins. Apidæ*, 415. 5; *Gerst.*  
*Reise nach Mossamb.* v. 422.
- A. nigripennis*, *Latr. Ann. Mus. Hist. Nat.* v. 170. 4, t. 13. f. 7.
- A. bicolor*, *Klug, Mag. der Gesell. nat. Fr. zu Berlin* (1807), 264,  
t. 7. f. 3.
- A. zonata*, *Guér. Voy. Ind. Orient.* (Bélangier), p. 504, pl. 4. f. 6.
- A. testacca*, *Smith, Proc. Linn. Soc.* ii. 49. 5 (var. immature?).  
*Hab.* India; Malacca; Borneo; Ceylon; Java; Sumatra; Floris; and  
Timor.
2. *A. ZONATA*, *Smith, Proc. Linn. Soc.* iv. 8. 1.
- A. dorsata*, *Gerst. Ann. & Mag. Nat. Hist.* (1863), 344.  
*Hab.* Celebes; Philippines.
3. *A. ADANSONII*, *Latr. Ann. Mus. Nat. Hist.* v. 172.
- A. scutellata*, *St.-Farg. Hym.* i. 404.
- A. nigritarum*, *St.-Farg. Hym.* i. 406.
- A. caffra*, *St.-Farg. Hym.* i. 402.
- A. unicolor*, *Latr. Ann. Mus. Hist. Nat.* v. 168?
- A. mellifica*, *Gerst. Ann. & Mag. Nat. Hist.* 1863, *nec Linn.*  
*Hab.* Africa: Niger; Gambia; interior of South Africa.
4. *A. INDICA*, *Fabr. Syst. Piez.* p. 370.
- A. Peronii*, *Latr. Ann. Mus. Hist. Nat.* v. 173.
- A. socialis*, *Latr. Ann. Mus. Hist. Nat.* v. 172.
- A. Delessertii*, *Guér. Icon. Règ. Anim.* 461.
- A. Perrottetii*, *Guér. Icon. Règ. Anim.* 461.
- A. dorsata*, *St.-Farg. Hym.* i. 405.
- Hab.* India (Neelgherries, Pondicherry); Malacca; Borneo; Java;  
Sumatra; Flores; Timor.
5. *A. NIGROCINCTA*, *Smith, Proc. Linn. Soc.* v. 93.
- A. indica*, *Gerst. Ann. & Mag. Nat. Hist.* (1863), 343. var.  
*Hab.* Celebes; Borneo; China.
6. *A. FLORALIS*, *Fabr. Syst. Piez.* p. 373 (Anthophora), ♀.
- A. andreniformis*, *Smith, Proc. Linn. Soc.* ii. 49.

*Apis lobata*, *Smith, Cat. Hym. Ins. Apidæ*, ii. 416, ♂.

*A. indica*, *Latr. Ann. Mus. Hist. Nat.* v. 169.

*Hab.* India; Borneo; Ceylon.

## Fam. CHRYSIDIDÆ.

### Gen. STILBUM, *Spin.*

1. *STILBUM SPLENDIDUM*, *Fabr. Syst. Piez.* p. 170. 1 (*Chrysis*);  
*Smith, Proc. Linn. Soc.* iii. 177. 1.

*Hab.* Tranquebar; Bengal; Aru; Java; Celebes.

2. *S. AMETHYSTINUM*, *Fabr. Syst. Piez.* p. 176. 32; *Smith, Proc. Linn. Soc.* iii. 177. 2.

*Hab.* Aru; Australia.

### Gen. HEDYCHRUM, *Latr.*

1. *HEDYCHRUM TIMIDUM*, *Dahlb. Hym. Europ.* ii. 65. 36.

*Hab.* India (Bengal).

2. *H. RUGOSUM*, *Smith, Ann. & Mag. Nat. Hist.* (1852) 2nd ser. ix. 45.

*Hab.* India (Poonah).

3. *H. FLAMMULATUM*, *Smith, Proc. Linn. Soc.* iii. 26. 1.

*Hab.* Celebes.

4. *H. ORIENTALE*, *Smith, Proc. Linn. Soc.* ii. 128. 1.

*Hab.* Singapore.

### Gen. HOLOPYGA, *Dahlb.*

1. *HOLOPYGA PURPUREA*, *Smith, Proc. Linn. Soc.* v. 68. 1.

*Hab.* Celebes.

### Gen. CHRYSIS, *Linn.*

1. *CHRYSIS DISSIMILIS*, *Dahlb. Hym. Europ.* ii. 202. 109.

*Hab.* India (Bengal).

2. *C. REICHEI*, *Dahlb. Hym. Eur.* ii. 218. 119.

*Hab.* Coromandel.

3. *C. ORIENTALIS*, *Dahlb. Hym. Eur.* ii. 225. 124, ♀.

*Hab.* India.

4. *C. AMETHYSTINA*, *Fabr. Syst. Piez.* 176. 32; *Dahlb. Hym. Eur.* ii. 229. 127, ♂, ♀.

*Hab.* India.

5. *C. EXULANS*, *Dahlb. Hym. Eur.* ii. 247. 137.

*Hab.* India (Bengal).

6. *CHRYSIS SCHIÖDTEI*, *Dahlb. Hym. Eur.* ii. 309. 175, ♀.  
*Hab.* India.
7. *C. OCOLATA*, *Fabr. Syst. Piez.* p. 171. 6; *Dahlb. Hym. Eur.* ii. 310. 176.  
*Hab.* India.
8. *C. MALACHITICA*, *Smith, Proc. Linn. Soc.* ii. 128. 2.  
*Hab.* Borneo.
9. *C. VESTIGATA*, *Smith, Proc. Linn. Soc.* ii. 128. 3.  
*Hab.* Borneo.
10. *C. PURPUREA*, *Smith, Proc. Linn. Soc.* iii. 26. 1.  
*Hab.* Celebes.
11. *C. INSULARIS*, *Smith, Proc. Linn. Soc.* iii. 26. 2.  
*Hab.* Celebes.
12. *C. SUMPTUOSA*, *Smith, Proc. Linn. Soc.* iii. 27. 3.  
*Hab.* Celebes.
13. *C. APRICANS*, *Smith, Proc. Linn. Soc.* v. 66. 1.  
*Hab.* Celebes.
14. *C. OBSCURA*, *Smith, Proc. Linn. Soc.* v. 67. 2.  
*Hab.* Celebes.
15. *C. FUMIPENNIS*, *Smith, Proc. Linn. Soc.* v. 67. 3.  
*Hab.* Celebes.
16. *C. SEDUCTA*, *Smith, Proc. Linn. Soc.* v. 67. 4.  
*Hab.* Celebes.
17. *C. INTRUDENS*, *Smith, Proc. Linn. Soc.* viii. 62. 1.  
*Hab.* New Guinea.
18. *C. PARALLELA*, *Brullé, Hym.* iv. 29. 9.  
*Hab.* Timor.
19. *C. FUSCIPENNIS*, *Brullé, Hym.* iv. 38. 24.  
*Hab.* India; Philippines.
20. *C. ASPERA*, *Brullé, Hym.* iv. 46. 35.  
*Hab.* Philippines.
21. *C. PUBESCENS*, *Smith, Ann. & Mag. Nat. Hist.* (1852) 2nd ser. ix. 45.  
*Hab.* India (Bombay).

## Fam. EVANIADÆ, Shuck.

Gen. EVANIA, *Fabr.*

1. EVANIA LÆVIGATA, *Latr. Gen. Crust. et Ins.* iii. 251; *Westw. Mon. Evan. &c. Trans. Ent. Soc. Lond.* iii. 241.

*Hab.* Celebes; India; New Guinea; Africa; Australia; Brazil; Mexico.

2. E. ANTENNALIS, *Westw. Trans. Ent. Soc. Lond.* iii. 244. 13.

*Hab.* India.

3. E. STRIATA, *Smith, Proc. Linn. Soc.* v. 58. 1, ♀.

*Hab.* Celebes.

Gen. HYPTIA, *Illiger.*

1. HYPTIA JAVANICA, *Westw. Trans. Ent. Soc. Lond.* iii. 245. 22.

*Hab.* Java.

Gen. FÆNUS, *Fabr.*

1. FÆNUS GRACILIS, *Smith, Proc. Linn. Soc.* iii. 169. 1, ♀.

*Hab.* Aru; Celebes.

## Fam. AULACIDÆ, Shuck.

Gen. TRYGONALYS, *Westw.*

1. TRYGONALYS PICTIFRONS, *Smith, Proc. Linn. Soc.* v. 57. 1, ♂, ♀.

*Hab.* Celebes.

Gen. AULACUS, *Jurine.*

1. AULACUS SIGNATUS, *Shuck. Entom.* (1841), 124. 7.

*Hab.* Ceylon.

Gen. STENOPHASMUS, *Smith.*

1. STENOPHASMUS RUFICEPS, *Smith, Proc. Linn. Soc.* iii. 170. 1, ♀.

*Hab.* Aru.

Gen. FÆNATOPUS, *Smith.*

1. FÆNATOPUS RUFICEPS, *Smith, Proc. Linn. Soc.* v. 58. 1, ♀.

*Hab.* Celebes.

Gen. MEGISCHUS, *Brullé.*

1. MEGISCHUS (PIMPLA) CORONATOR, *Fabr. Syst. Piez.* p. 118. 28; *St.-Farg. Encycl. Méth.*; *Brullé, Hym.* iv. 538. 1; *Westw. Trans. Ent. Soc. Lond.* iii. 276. 2 (1841); *Smith, Proc. Linn. Soc.* v. 137. 1, ♀.

*Hab.* India; Bachian; New Guinea; Amboyna; Morty Island; Salwatty.

2. M. INDICUS, *Westw. Trans. Ent. Soc. Lond.* (1841) iii. 277. 9, ♀,

and *Trans. Ent. Soc. Lond.* (1851) i. new ser. 229; *Smith, Proc. Linn. Soc.* iii. 23. 1.

*Hab.* India; Celebes; Philippines.

3. *MEGISCHUS DUCALIS*, *Westw. Trans. Ent. Soc. Lond.* (1851), i. new ser. 228; *Smith, Proc. Linn. Soc.* v. 59. 1.

*Hab.* Java; Celebes; India.

4. *M. TARSALIS*, *Smith, Proc. Linn. Soc.* v. 137. 2, ♀.

*Hab.* Bachian; Ceram.

5. *M. VIDUUS*, *Smith, Proc. Linn. Soc.* v. 138. 3, ♂.

*Hab.* Kaisaa; Ceram; Bachian.

6. *M. SPOLIATOR*, *Smith, Proc. Linn. Soc.* vii. 6. 3, ♀.

*Hab.* Waigiou.

7. *M. INSIDIATOR*, *Smith, Proc. Linn. Soc.* vii. 7. 4, ♂.

*Hab.* Mysol.

#### Fam. ICHNEUMONIDÆ, Leach.

##### Gen. ICHNEUMON, *Linn.*

1. *ICHNEUMON ALBATORIUS*, *Brullé, Hym.* iv. 307. 13, ♂, ♀.

*Hab.* Java.

2. *I. PENETRANS*, *Smith, Proc. Linn. Soc.* ii. 117. 1, ♀.

*Hab.* Borneo.

3. *I. COMISSATOR*, *Smith, Proc. Linn. Soc.* ii. 118. 2, ♂.

*Hab.* Borneo.

4. *I. INSULARIS*, *Smith, Proc. Linn. Soc.* iii. 170. 1.

*Hab.* Key Island; Celebes.

5. *I. SICARIUS*, *Smith, Proc. Linn. Soc.* v. 59. 1, ♂ (*I. insularis*, *Sm.* nec sp. 4).

*Hab.* Celebes.

6. *I. PRÆDATORIUS*, *Smith, Proc. Linn. Soc.* v. 59. 2.

*Hab.* Celebes.

7. *I. EPHIPPIUM*, *Smith, Proc. Linn. Soc.* v. 59. 3, ♀.

*Hab.* Celebes.

8. *I. PALLIDIPICTUS*, *Smith, Proc. Linn. Soc.* vi. 62. 1.

*Hab.* Celebes.

##### Gen. TRYPHON, *Grav.*

1. *TRYPHON LUTORIUS*, *Smith, Proc. Linn. Soc.* v. 60. 1.

*Hab.* Celebes.

##### Gen. ISCHNOCERUS, *Grav.*

1. *ISCHNOCERUS DIMIDIATUS*, *Brullé, Hym.* iv. 262. 3, ♀, pl. 42. f. 1.

*Hab.* New Guinea.



2. *ISCHNOCERUS CANCELLATUS*, Brullé, *Hym.* iv. 262. 4, ♀.

*Hab.* Java.

3. *I. FASCIATA*, Smith, *Proc. Linn. Soc.* v. 62. 1, ♀ (*maculipennis*, Smith, nec Brullé).

*Hab.* Celebes.

Gen. *METOPIUS*, Panz.

1. *METOPIUS CRASSIPES*, Smith, *Proc. Linn. Soc.* v. 62. 1.

*Hab.* Celebes.

Gen. *CRYPTUS*, Fabr.

1. *CRYPTUS TRICOLOR*, Brullé, *Hym.* iv. 195. 16, ♂.

*Hab.* India.

2. *C. MESOXANTHUS*, Brullé, *Hym.* iv. 196. 17, ♀.

*Hab.* Java.

3. *C. ELEGANTULUS*, Brullé, *Hym.* iv. 198. 19, ♀.

*Hab.* Java.

4. *C. CROCEIPES*, Smith, *Proc. Linn. Soc.* ii. 118. 1, ♀.

*Hab.* Borneo.

5. *C. ELEGANS*, Smith, *Proc. Linn. Soc.* ii. 118. 2, ♀.

*Hab.* Borneo.

6. *C. LEPIDUS*, Smith, *Proc. Linn. Soc.* ii. 119. 3, ♀.

*Hab.* Borneo.

7. *C. SCUTELLATUS*, Smith, *Proc. Linn. Soc.* iii. 170. 1, ♀.

*Hab.* Aru.

8. *C. OPACUS*, Smith, *Proc. Linn. Soc.* v. 60. 1, ♀.

*Hab.* Celebes.

9. *C. SPOLIATOR*, Smith, *Proc. Linn. Soc.* v. 61. 2, ♀.

*Hab.* Celebes.

10. *C. ALBO-PICTUS*, Smith, *Proc. Linn. Soc.* v. 61. 3, ♀.

*Hab.* Celebes; Mysol.

11. *C. VARIEGATUS*, Smith, *Proc. Linn. Soc.* v. 61. 4, ♀.

*Hab.* Celebes.

12. *C. PETIOLATUS*, Smith, *Proc. Linn. Soc.* v. 62. 5, ♀.

*Hab.* Celebes.

13. *C. SICARIUS*, Smith, *Proc. Linn. Soc.* v. 138. 1, ♀.

*Hab.* Dory; Bachian; Gilolo; Celebes.

14. *C. FERRUGINEUS*, Smith, *Proc. Linn. Soc.* vi. 63. 2, ♀.

*Hab.* Celebes.

15. *C. VOLATILIS*, Smith, *Proc. Linn. Soc.* vii. 7. 2, ♀.

*Hab.* Mysol; New Guinea.

16. *CRYPTUS TARSATUS*, *Smith, Proc. Linn. Soc.* vii. 7. 3, ♂.  
*Hab.* Mysol; New Guinea.

17. *C. DUCALIS*, *Smith, Proc. Linn. Soc.* viii. 63. 3, ♀.  
*Hab.* Morty Island.

Gen. *JOPPA*, *Fabr.*

1. *JOPPA RUFA*, *Brullé, Hym.* iv. 294. 48, ♂, ♀.  
*Hab.* India (Bengal).

2. *J. SEMIRUFA*, *Brullé, Hym.* iv. 296. 51, ♀.  
*Hab.* Java.

Gen. *TROGUS*, *Grav.*

1. *TROGUS BRUNNEIPENNIS*, *Smith, Proc. Linn. Soc.* v. 59. 1.  
*Hab.* Celebes.

Gen. *MESOSTENUS*, *Grav.*

1. *MESOSTENUS LITERATUS*, *Brullé, Hym.* iv. 223. 29, ♂, ♀.  
*Hab.* Philippines.

2. *M. MARGINATUS*, *Brullé, Hym.* iv. 224. 30, ♀.  
*Hab.* India (Bengal).

3. *M. GENICULATUS*, *Brullé, Hym.* iv. 224. 32, ♀.  
*Hab.* India (Bengal).

4. *M. LEUCOZONIUS*, *Brullé, Hym.* iv. 231. 40, ♀.  
*Hab.* New Guinea.

5. *M. OCHROPUS*, *Brullé, Hym.* iv. 232. 41, ♀.  
*Hab.* India.

6. *M. ANNULIPES*, *Brullé, Hym.* iv. 233. 43, ♀.  
*Hab.* Java.

7. *M. VESICULOSUS*, *Brullé, Hym.* iv. 240. 53. ♀.  
*Hab.* Java.

8. *M. ALBO-SPINOSUS*, *Smith, Proc. Linn. Soc.* iii. 23. 1, ♀.  
*Hab.* Celebes.

9. *M. BIMACULATUS*, *Smith, Proc. Linn. Soc.* iii. 24. 2, ♀.  
*Hab.* Celebes.

10. *M. PICTUS*, *Smith, Proc. Linn. Soc.* iii. 171. 1, ♀.  
*Hab.* Aru.

11. *M. AGILIS*, *Smith, Proc. Linn. Soc.* iii. 171. 2, ♀.  
*Hab.* Aru.

12. *M. ALBO-PICTUS*, *Smith, Proc. Linn. Soc.* iv. 172. 3, ♀.  
*Hab.* Key Island.

13. MESOSTENUS INSIDIATOR, *Smith, Proc. Linn. Soc.* v. 60. 1, ♀.

*Hab.* Celebes.

14. M. DECORATUS, *Smith, Proc. Linn. Soc.* vi. 63. 1, ♀.

*Hab.* Gilolo.

15. M. MULTIPICTUS, *Smith, Proc. Linn. Soc.* vii. 8. 1, ♀.

*Hab.* Mysol.

16. M. PULCHERRIMUS, *Smith, Proc. Linn. Soc.* vii. 8. 2, ♀.

*Hab.* Waigiou.

17. M. ARROGANS, *Smith, Proc. Linn. Soc.* viii. 63. 2, ♀.

*Hab.* New Guinea.

#### Gen. HEMITELES, *Grav.*

1. HEMITELES TRIPARTITUS, *Brullé, Hym.* iv. 258. 9, ♂.

*Hab.* India (Pondicherry).

#### Gen. GLYPTA, *Grav.*

1. GLYPTA MACULIPENNIS, *Smith, Proc. Linn. Soc.* v. 62. 1, ♀.

*Hab.* Celebes.

2. G. IRIDIPENNIS, *Smith, Proc. Linn. Soc.* v. 63. 2, ♀.

*Hab.* Celebes.

3. G. FRACTICORNIS, *Smith, Proc. Linn. Soc.* vii. 10. 1, ♀.

*Hab.* Mysol; New Guinea.

#### Gen. PIMPLA, *Fabr.*

1. PIMPLA PUNCTUM, *Brullé, Hym.* iv. 87. 1, ♂.

*Hab.* Philippines.

2. P. BIPARTITA, *Brullé, Hym.* iv. 88. 2, ♀.

*Hab.* India.

3. P. ERUCTATOR, *Brullé, Hym.* iv. 88. 3, ♀.

*Hab.* New Guinea.

4. P. FLAVICEPS, *Brullé, Hym.* iv. 93. 11, ♀.

*Hab.* New Guinea.

5. P. PUNCTATA, *Fabr. Syst. Piez.* p. 119. 32; *Brullé, Hym.* iv. 94. 13;  
*Smith, Proc. Linn. Soc.* ii. 119. 1.

*Hab.* India; Borneo.

6. P. PEDATOR, *Fabr. Syst. Piez.* p. 114. 6; *Brullé, Hym.* iv. 94.  
14. ♀.

*Hab.* India.

7. P. TRIMACULATA, *Smith, Proc. Linn. Soc.* iii. 24. 2, ♀.

*Hab.* Celebes.

8. *PIMPLA OCHRACEA*, *Smith, Proc. Linn. Soc.* iii. 172. 1, ♀.  
*Hab.* Aru.
9. *P. BRACONOIDES*, *Smith, Proc. Linn. Soc.* iii. 172. 2, ♀.  
*Hab.* Key Island.
10. *P. PENETRANS*, *Smith, Proc. Linn. Soc.* iii. 173. 3, ♀.  
*Hab.* Aru.
11. *P. FERRUGINEA*, *Smith, Proc. Linn. Soc.* iii. 173. 4, ♀.  
*Hab.* Key Island.
12. *P. PLAGIATA*, *Smith, Proc. Linn. Soc.* iii. 173. 5, ♀.  
*Hab.* Aru.
13. *P. INFIRMA*, *Smith, Proc. Linn. Soc.* v. 63. 1, ♀.  
*Hab.* Celebes.
14. *P. UNICOLOR*, *Smith, Proc. Linn. Soc.* v. 63. 2, ♀.  
*Hab.* Celebes.
15. *P. INSOLENS*, *Smith, Proc. Linn. Soc.* v. 64. 3, ♀.  
*Hab.* Celebes.
16. *P. MODESTA*, *Smith, Proc. Linn. Soc.* v. 64. 4, ♀.  
*Hab.* Celebes.
17. *P. VIRIDIPENNIS*, *Smith, Proc. Linn. Soc.* v. 64. 5, ♂.  
*Hab.* Celebes.
18. *P. FORMOSA*, *Smith, Proc. Linn. Soc.* v. 139. 1, ♀.  
*Hab.* Bachian.
19. *P. FENESTRATA* (*FLAVICEPS*, *Smith, Proc. Linn. Soc.* v. 139.  
2, ♀, *nec flaviceps*, *Brullé*).  
*Hab.* Bachian.
20. *P. INTEGRATA*, *Smith, Proc. Linn. Soc.* v. 140. 3, ♀.  
*Hab.* Bachian.
21. *P. PLACIDA*, *Smith, Proc. Linn. Soc.* v. 140. 4, ♀.  
*Hab.* Bachian.
22. *P. ARROGANS*, *Smith, Proc. Linn. Soc.* vii. 8. 2, ♀.  
*Hab.* Ceram.
23. *P. APICALIS*, *Smith, Proc. Linn. Soc.* vii. 9. 3, ♂.  
*Hab.* Ceram.
24. *P. INSIDIATOR*, *Smith, Proc. Linn. Soc.* vii. 9. 4, ♀.  
*Hab.* Mysol; Aru.
25. *P. DESTRUCTOR*, *Smith, Proc. Linn. Soc.* vii. 9. 5, ♀.  
*Hab.* Mysol.
26. *P. INCISA*, *Smith, Proc. Linn. Soc.* vii. 9. 6, ♀.  
*Hab.* Ceram.

27. *PIMPLA INIMICA*, *Smith, Proc. Linn. Soc.* vii. 10. 7, ♀.  
*Hab.* Mysol.
28. *P. CAUDATA*, *Smith, Proc. Linn. Soc.* vii. 10. 8, ♀.  
*Hab.* Mysol.
29. *P. OBNOXIA*, *Smith, Proc. Linn. Soc.* viii. 64. 6, ♀.  
*Hab.* Morty Island.
30. *P. DILIGENS*, *Smith, Proc. Linn. Soc.* viii. 64. 7, ♀.  
*Hab.* Morty Island.
31. *P. TRIFASCIATA*, *Smith, Proc. Linn. Soc.* viii. 64. 8, ♀.  
*Hab.* New Guinea.
32. *P. NIGRICORNIS*, *Smith, Proc. Linn. Soc.* viii. 64. 9, ♂.  
*Hab.* New Guinea.
33. *P. INTERCEPTOR*, *Smith, Proc. Linn. Soc.* viii. 65. 10, ♀.  
*Hab.* New Guinea.

Gen. *MACROGASTER*, *Brullé*.

1. *MACROGASTER FLAVO-PICTUS*, *Smith, Proc. Linn. Soc.* ii. 121.  
1, ♀.  
*Hab.* Singapore.

Gen. *RHYSSA*, *Grav.*

1. *RHYSSA MIRABILIS*, *Smith, Proc. Linn. Soc.* ii. 120. 1, ♀.  
*Hab.* Borneo.
2. *R. MACULIPENNIS*, *Smith, Proc. Linn. Soc.* ii. 120. 2, ♀.  
*Hab.* Borneo.
3. *R. FASCIATA*, *Smith, Proc. Linn. Soc.* iii. 173. 1, ♂ (*R. maculipennis*, *Smith, nec sp.* 2).  
*Hab.* Aru.
4. *R. VESTIGATOR*, *Smith, Proc. Linn. Soc.* iii. 174. 2, ♂.  
*Hab.* Aru.
5. *R. NOBILITATOR*, *Smith, Proc. Linn. Soc.* vi. 63. 1, ♀.  
*Hab.* Celebes.

Gen. *ANOMALON*, *Grav.*

1. *ANOMALON FALCATOR*, *Smith, Proc. Linn. Soc.* v. 64. 1.  
*Hab.* Celebes.

Gen. *XYLONOMUS*, *Grav.*

1. *XYLONOMUS FULGIDIPENNIS*, *Smith, Proc. Linn. Soc.* v. 122.  
1, ♀.  
*Hab.* Borneo.
2. *H. FLAVIFRONS*, *Smith, Proc. Linn. Soc.* vi. 64. 1, ♀.  
*Hab.* Gilolo.



3. *XYLONOMUS FRACTICORNIS*, *Smith, Proc. Linn. Soc.* v. 142. 1, ♀.  
*Hab.* Bachian.

Gen. *EPIXORIDES*, *Smith*.

1. *EPIXORIDES CHALYBEATOR*, *Smith, Proc. Linn. Soc.* vi. 64. 1, ♂.  
*Hab.* Ceram.

Gen. *OPHION*, *Fabr.*

1. *OPHION TRILOBUS*, *Brullé, Hym.* iv. 145. 16.  
*Hab.* Java.
2. *O. PLICATUS*, *Brullé, Hym.* iv. 145. 17.  
*Hab.* Java.
3. *O. UNIVITTATUS*, *Brullé, Hym.* iv. 146. 19.  
*Hab.* India.
4. *O. FLAVO-LINEATUS*, *Brullé, Hym.* iv. 147. 21.  
*Hab.* New Guinea (Dory).
5. *O. IRIDIPENNIS*, *Smith, Proc. Linn. Soc.* ii. 121. 1, ♀.  
*Hab.* Borneo.
6. *O. VESTIGATOR*, *Smith, Proc. Linn. Soc.* ii. 122. 2, ♀.  
*Hab.* Malacca.
7. *O. VITTATOR*, *Smith, Proc. Linn. Soc.* v. 140. 1, ♀.  
*Hab.* Bachian.
8. *O. UNICOLOR*, *Smith, Proc. Linn. Soc.* v. 141. 2, ♀.  
*Hab.* Bachian.
9. *O. INSINUATOR*, *Smith, Proc. Linn. Soc.* v. 141. 3, ♀.  
*Hab.* Kaisaa.
10. *O. STIMULATOR*, *Smith, Proc. Linn. Soc.* viii. 65. 1, ♀.  
*Hab.* New Guinea.

Gen. *PANISCUS*, *Grav.*

1. *PANISCUS LINEATUS*, *Brullé, Hym.* iv. 157. 4, ♀.  
*Hab.* India (Bengal).
2. *P. NIGRIVENTRIS*, *Brullé, Hym.* iv. 157. 5, ♀.  
*Hab.* Java.

Fam. *BRACONIDÆ*, *Westw.*

Gen. *BRACON*, *Fabr.*

1. *BRACON ACULEATOR*, *Fabr. Syst. Piez.* p. 107. 21; *Smith, Proc. Linn. Soc.* ii. 122. 1.  
*Hab.* India.
2. *B. LAMINATOR*, *Fabr. Syst. Piez.* p. 103. 5.  
*Hab.* India.

3. *B. BRACON DIMIDIATOR*, *Fabr. Syst. Piez.* p. 104. 12.  
*Hab.* Sumatra.
4. *B. FEMORATOR*, *Fabr. Syst. Piez.* p. 107. 23.  
*Hab.* India (Tranquebar).
5. *B. ARMATOR*, *Fabr. Syst. Piez.* p. 107. 25.  
*Hab.* Sumatra.
6. *B. EXSPECTATOR*, *Fabr. Syst. Piez.* p. 108. 27.  
*Hab.* Sumatra.
7. *B. FLAVIFRONS*, *Fabr.*, *Brullé, Hym.* iv. 417. 102, ♂.  
*Hab.* Java.
8. *B. BRULLEI*, *Smith*.  
*B. laminator*, *Brullé, Hym.* iv. 419. 104 (nec *Fabr.*).  
*Hab.* India.
9. *B. NIGRIFRONS*, *Brullé, Hym.* iv. 421. 105, ♀.  
*Hab.* Philippines.
10. *B. NIGRIDORSIS*, *Brullé, Hym.* iv. 422. 107, ♀.  
*Hab.* Java.
11. *B. LARVA*, *Brullé, Hym.* iv. 422, 108.  
*Hab.* Java.
12. *B. HINDOSTANUS*, *Smith*.  
*B. apicalis*, *Brullé, Hym.* iv. 432. 119 (nec *B. apicalis*, *Hym.* 385. 63, Cayenne).  
*Hab.* India.
13. *B. MARGINELLUS*, *Brullé, Hym.* iv. 435. 123, ♀.  
*Hab.* New Guinea.
14. *B. INSINUATOR*, *Smith, Proc. Linn. Soc.* iii. 24. 1, ♀.  
*Hab.* Celebes.
15. *B. INTRUDENS*, *Smith, Proc. Linn. Soc.* iii. 25. 2, ♀.  
*Hab.* Celebes.
16. *B. QUADRICEPS*, *Smith, Proc. Linn. Soc.* ii. 122. 2, ♀ (*Myosoma*, *Brullé?*).  
*Hab.* Borneo.
17. *B. SUSPICIOSUS*, *Smith, Proc. Linn. Soc.* ii. 123. 3, ♀ (*Myosoma?*).  
*Hab.* Borneo.
18. *B. INSIGNIS*, *Smith, Proc. Linn. Soc.* ii. 123. 4, ♀.  
*Hab.* Borneo.
19. *B. CEPHALOTES*, *Smith, Proc. Linn. Soc.* ii. 123. 5, ♀.  
*Hab.* Borneo.

20. *B. BRACON PERPLEXUS*, *Smith, Proc. Linn. Soc.* ii. 124. 6, ♀.  
*Hab.* Borneo.
21. *B. VAGATUS*, *Smith, Proc. Linn. Soc.* ii. 124. 7, ♀.  
*Hab.* Malacca.
22. *B. INQUIETUS*, *Smith, Proc. Linn. Soc.* ii. 124. 8, ♀.  
*Hab.* Borneo.
23. *B. RUGIFRONS*, *Smith, Proc. Linn. Soc.* ii. 125. 9, ♀.  
*Hab.* Borneo.
24. *B. FLORALIS*, *Smith, Proc. Linn. Soc.* ii. 125. 10, ♀.  
*Hab.* Borneo.
25. *B. VULTUOSUS*, *Smith, Proc. Linn. Soc.* ii. 125. 11, ♀.  
*Hab.* Singapore.
26. *B. FOVEATUS*, *Smith, Proc. Linn. Soc.* ii. 126. 12, ♀.  
*Hab.* Singapore.
27. *B. LABORIOSUS*, *Smith, Proc. Linn. Soc.* ii. 126. 13, ♀.  
*Hab.* Borneo.
28. *B. CRASSIPES*, *Smith, Proc. Linn. Soc.* ii. 126. 14, ♀.  
*Hab.* Singapore.
29. *B. BASALIS*, *Smith, Proc. Linn. Soc.* iii. 174. 1, ♀.  
*Hab.* Aru.
30. *B. ALBO-MARGINATUS*, *Smith, Proc. Linn. Soc.* iii. 175. 3, ♀.  
*Hab.* Aru.
31. *B. NIGRIPENNIS*, *Smith, Proc. Linn. Soc.* iii. 175. 3, ♀.  
*Hab.* Aru.
32. *B. EXOLETUS*, *Smith, Proc. Linn. Soc.* iii. 175. 4, ♀.  
*Hab.* Aru.
33. *B. ABDOMINALIS*, *Smith, Proc. Linn. Soc.* iii. 175. 5, ♀.  
*Hab.* Aru.
34. *B. NITIDUS*, *Smith, Proc. Linn. Soc.* iii. 175. 6, ♀.  
*Hab.* Aru.
35. *B. PALLIFRONS*, *Smith, Proc. Linn. Soc.* iii. 176. 7, ♀.  
*Hab.* Aru.
36. *B. SALUTATOR*, *Smith*.  
*B. intrudens*, *Smith, Proc. Linn. Soc.* iii. 176. 8, ♀ (*nec B. intrudens*, iii.  
25. 2).  
*Hab.* Aru.
37. *B. DECEPTOR*, *Smith, Proc. Linn. Soc.* v. 65. 1, ♀.  
*Hab.* Celebes.

38. *B. BELLICOSUS*, *Smith, Proc. Linn. Soc.* v. 65. 2, ♀.  
*Hab.* Celebes.
39. *B. COMBUSTUS*, *Smith, Proc. Linn. Soc.* v. 65. 3, ♀.  
*Hab.* Celebes.
40. *B. JACULATOR*, *Smith, Proc. Linn. Soc.* v. 141. 2, ♀.  
*Hab.* Bachian.
41. *B. QUADRICEPS*, *Smith, Proc. Linn. Soc.* v. 141. 3, ♀.  
*Hab.* Bachian.
42. *B. INGENS*, *Smith, Proc. Linn. Soc.* vi. 25. 1, ♀.  
*Hab.* Celebes.
43. *B. PENETRANS*, *Smith, Proc. Linn. Soc.* vi. 65. 3, ♀ (*Myosoma*?).  
*Hab.* Ceram.
44. *B. OCCULTATOR*, *Smith, Proc. Linn. Soc.* vii. 11. 1, ♀.  
*Hab.* Mysol.
45. *B. PENETRATOR*, *Smith, Proc. Linn. Soc.* vii. 11. 2, ♀.  
*Hab.* Mysol.
46. *B. GRAVIDUS*, *Smith, Proc. Linn. Soc.* viii. 66. 3, ♀.  
*Hab.* New Guinea.
47. *B. FERAX*, *Smith, Proc. Linn. Soc.* viii. 66. 4, ♀.  
*Hab.* New Guinea.
48. *B. FLAVICEPS*, *Smith, Proc. Linn. Soc.* viii. 66. 5, ♀.  
*Hab.* Salwatty.

Gen. *AGATHIS*, *Latr.*

1. *A. AGATHIS TERMINALIS*, *Brullé, Hym.* iv. 484. 2, ♀.  
*Hab.* Bouru.
2. *A. FLAVIPENNIS*, *Brullé, Hym.* iv. 484. 3, ♂.  
*Hab.* India; Singapore.
3. *A. GUINEENSIS* nec *FLAVIPENNIS*, *Brullé, Hym.* iv. 485. 4, ♂.  
*Hab.* New Guinea (*Dory*).
4. *A. CLATHRATA*, *Brullé, Hym.* iv. 487. 7, ♂.  
*Hab.* Java.
5. *A. MACULIPENNIS*, *Brullé, Hym.* iv. 488. 9, ♂.  
*Hab.* India.
6. *A. SUBFASCIATA*, *Brullé, Hym.* iv. 489. 10, ♀.  
*Hab.* India.
7. *A. SEMIFUSCA*, *Brullé, Hym.* iv. 490. 11, ♂.  
*Hab.* India.

8. AGATHIS FUSCIPENNIS, *Brullé, Hym.* iv. 493. 15, ♂.  
*Hab.* Java.
9. A. SCULPTURALIS, *Smith, Proc. Linn. Soc.* iii. 25. 1, ♂.  
*Hab.* Celebes.
10. A. MODESTA, *Smith, Proc. Linn. Soc.* iii. 25. 2, ♀.  
*Hab.* Celebes.
11. A. NITIDA, *Smith, Proc. Linn. Soc.* iii. 26. 3.  
*Hab.* Celebes.
12. A. FUMIPENNIS, *Smith, Proc. Linn. Soc.* iii. 176. 1, ♀.  
*Hab.* Aru.
13. A. PENETRANS, *Smith, Proc. Linn. Soc.* v. 66. 1, ♀.  
*Hab.* Celebes.
14. A. RUGIFRONS, *Smith, Proc. Linn. Soc.* v. 66. 2, ♂.  
*Hab.* Celebes.
15. A. ATROCEPHALUS, *Smith, Proc. Linn. Soc.* v. 142. 1, ♂.  
*Hab.* Bachian.
16. A. STRIATA, *Smith, Proc. Linn. Soc.* vi. 66. 2, ♀.  
*Hab.* Gilolo.
17. A. DECEPTOR, *Smith, Proc. Linn. Soc.* vii. 12. 1, ♀.  
*Hab.* Ceram.
18. A. FLAVIPENNIS, *Smith, Proc. Linn. Soc.* vii. 12. 2, ♀.  
*Hab.* Ceram.
19. A. INTERDICTA, *Smith, Proc. Linn. Soc.* viii. 67. 2, ♀.  
*Hab.* New Guinea.
20. A. FENESTRATA, *Smith, Proc. Linn. Soc.* viii. 67. 3, ♀.  
*Hab.* New Guinea.

Gen. CENOCÆLIUS, *Halid.*

1. CENOCÆLIUS CEPHALOTES, *Smith, Proc. Linn. Soc.* v. 65. 1, ♀.  
*Hab.* Celebes (Macassar); Gilolo.
2. C. INSIDIATOR, *Smith, Proc. Linn. Soc.* vii. 12. 1, ♀.  
*Hab.* Mysol.

Gen. SPINARIA, *Brullé.*

1. SPINARIA SULCATA, *Smith, Proc. Linn. Soc.* viii. 67. 1, ♀.  
*Hab.* Gilolo.

Gen. MICRODUS, *Esenb.*

1. MICRODUS APICALIS, *Smith, Proc. Linn. Soc.* ii. 127. 1, ♀.  
*Hab.* Singapore.



## Fam. TENTHREDINIDÆ, Leach.

Gen. CLADOMACRA, *Smith*.

1. CLADOMACRA MACROPUS, *Smith, Proc. Linn. Soc.* vi. 66. 1, ♂;  
*Ann. & Mag. Nat. Hist.* (1860) vi. 257.

*Hab.* Celebes.

Gen. TENTHREDO, *Linn.*

1. TENTHREDO COXALIS, *Smith, Proc. Linn. Soc.* ii. 116. 1, ♀.

*Hab.* Singapore.

Gen. XYPHIDRIA, *Latr.*

1. XYPHIDRIA RUFIPES, *Smith, Proc. Linn. Soc.* iii. 177. 1, ♀.

*Hab.* Aru.

2. X. LÆVICEPS, *Smith, Proc. Linn. Soc.* v. 137. 1, ♀.

*Hab.* Amboyna.

Gen. ORYSSUS, *Fabr.*

1. ORYSSUS MACULIPENNIS, *Smith, Proc. Linn. Soc.* iii. 177. 1, ♀.

*Hab.* Aru.

Gen. TREMEX, *Jurine*.

1. TREMEX INSULARIS, *Smith, Proc. Linn. Soc.* ii. 117. 1, ♀.

*Hab.* Borneo.

2. T. INSIGNIS, *Smith, Proc. Linn. Soc.* iii. 178. 1, ♀.

*Hab.* Aru.

A Table is appended giving the geographical distribution of those of the foregoing genera of which twenty species or upwards have been noticed, and a summary of the entire species enumerated.

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Elis, 31 species .....	15   3	...   4   14   1	2	2	...	...   ...   ...   1   2   ...   ...   ...	...   ...   ...   ...   ...   ...   ...	...   ...   ...   ...   ...   ...   ...	1
Pompilus, 32 species ...	15	2   1   2   2	1	10	...	4   ...   1   2   ...   2   ...   ...	2   1   1   1   ...	...	1
Agania, 34 species .....	3   ...	5   1   ...   6	...	12	...	1   ...   1   1   ...   2   ...   1	6   4   1   2	...	1
Mygimima, 23 species ...	5   ...	4   5   2   4	...	3	...	...   ...   2   ...   ...   5   1   ...	1   3   ...   3	...	2
Pelopaeus, 20 species ...	8   1	2   ...   3   3	1	3	...	2   ...   1   ...   ...   2   ...   ...	1   ...   ...   1	...	1
Spheg, 22 species .....	8   2	2   5   4   2	2	6	1	6   1   3   1   ...   5   ...   ...	6   ...   2   3	...	2
Larrada, 30 species .....	7	7	2	9	...	3   ...   1   ...   1   1   ...   1	1   ...   2   1	...	3
Eumenes, 39 species .....	8	2   2   2   6	2	9	...	2   2   6   ...   3   6   ...   2	...   3   1   4	...	3
Odynerus, 31 species ...	13   4	3   2   3   4	2	9	...	...   ...   3   1   ...   2   ...   ...	4   3   1   1	...	1
Icaria, 28 species .....	15	1   1   1   4	...	10	...	1   ...   3   ...   ...   3   ...   1	5   3   1   3	...	1
Polistes, 22 species .....	8   1	4   3   1   6	1	3	...	3   1   2   3   ...   6   ...   2	5   3   1   4	...	2
Vespa, 23 species .....	7	9	2	4	...	1   ...   1   1   1   3   ...   ...	...   1   ...   1	...	1
	6   4	...   2   4   1	2	4	...				
	6	5   1   6   4	4	3	1				
	12   6	8	3	3	...				
	12								

[illegible]





## Observations on a Light-giving Coleopterous Larva.

By Dr. HERMANN BURMEISTER, F.M.L.S.

[Read December 7, 1871.]

IN a box of books lately (April 18, 1871) received from London, I was pleased to find the continuation of the 'Journal of the Linnean Society' in exchange for the 'Annals of the Public Museum of Buenos Ayres.'

Amongst the papers which attracted my attention was one on a light-giving Coleopterous larva, named *Astraptor illuminator* (vol. x. p. 74), collected by Mr. A. Fry at Rio de Janeiro, and described and figured (Pl. I.) by Mr. A. Murray.

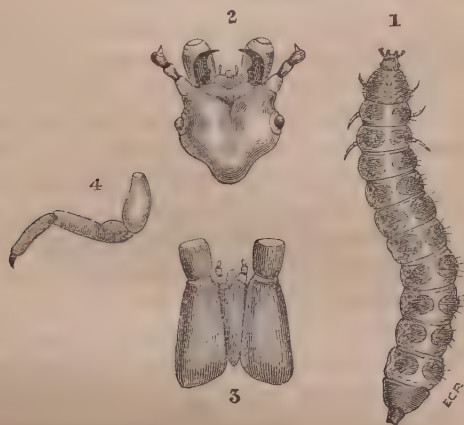
To the detailed description by Mr. Murray, some further notices are added in the same volume (p. 503) by another observer, Mr. R. Trimen, wherein he mentions a similar larva found here in Buenos Ayres, by Mr. Ogilvie, twelve years ago.

I was so fortunate as to observe the same larva at Paraná, the former capital of the Argentine Republic, in August 1858; and as Mr. Trimen's notice is rather brief, I thought it might be of some interest to the Society to receive a fuller description, with figures, which I therefore now send, in the hope that this account may bring forward some information as to the imago state of the insect produced from the larva, which has now been known for some time. I say advisedly that the larva has long been known, because Azara speaks of the same larva in his 'Voyage,' tom. i. p. 214, alluding to the double light from the body; and another full description of a nearly allied species from Brazil is given by Prof. F. T. Reinhardt, of Copenhagen, in a Danish periodical work which I do not exactly remember, but which I believe to be the 'Videnskabelige Meddelelser' for 1854.

My larva was of the same size as that described by Azara, 2 inches long and a  $\frac{1}{4}$  inch broad. The body was composed of the head and thirteen joints, of which the largest is that next the head, and the smallest is the short tube containing the anus. The colour was yellowish-brown, like that of the meal-worm (the larva of *Tenebrio molitor*), with the head rather darker. On examining the insect attentively, I could perceive that a large part of the surface of the body (namely the whole of the underside) and the incisions between the segments were of a paler, yellowish-white colour, and the skin was here very thin and soft; but on the upperside every one of the eleven segments, after

that immediately behind the head, had two small yellow-brown horny plates, one on each side of the dorsal vessel; the prothoracic segment and the penultimate segment were entirely covered with undivided horny plates of a rather darker colour; and the small terminal segment had a darker brown lateral scale on each side. The body of this larva was not smooth, like that of the meal-worm, but clothed with short hairs or bristles, placed on the dorsal horny plates, and with their points directed outwards, the remaining portions of the segments being smooth or naked.

My fig. 1 gives an exact view of this construction of the larva, natural size.



The head (fig. 2, magnified) is small in comparison with the large prothoracic segment, and somewhat retracted within that segment; it is covered by a darker horny skin, and is of a transverse oval form, with a short neck posteriorly, which fits into the anterior opening of the prothoracic segment. On the most prominent parts of the sides of the head are situated the eyes, which are black; in front of these are the short antennæ, placed on small prominences of the anterior lateral surface of the head. The antennæ consist of four joints: the first and broadest is soft, white, and conical; the second of the same length as the first, but more slender, horny, and dark brown, like the succeeding joints, and obconical; the third is oval, and rather thicker than the second; the fourth, inserted on the inner edge of the third

before the end, is a very short and thin point. Between the two prominences on which the antennæ are placed, is an impressed angular line, starting from the anterior base of each eminence, and emitting posteriorly, from the angle, another, short impressed line, which becomes evanescent between the eyes. This transverse line separates the small clypeus, of the same angulated figure, which has its anterior margin likewise angulated, supporting the soft (not horny) white upper lip, which is rather broader than long, and emarginated in the middle of the free margin. On the sides of this upper lip, next to the antennæ, the mandibles are conspicuous as two strong horny hooks of very dark colour, with a thin but very acute curved tip and a small angular tooth in the middle of the inside. Beneath the mandibles are situated the maxillæ, united with the intervening under lip, into a strong horny plate, divided by two ridges into three parts (fig. 3, magnified).

Of these three parts, the lateral ones are the broadest and longest, representing the trunks of the maxillæ, broadest at the base, narrowing to the tip, where there is a small cylindrical appendage, which appears to be the maxillary palpus, formed of a single great joint, united to the maxilla by a small and soft white ring, which, judging by analogy from the antennæ and the labial palpi, may be the first joint of the maxillary palpus. At the other end there is also a soft white convex surface, which seems as though divided by a circular impression in the middle into two joints—a small circular one in the centre, and a larger annular one around it. If we look upon these two white parts of the tip of this curious maxillary palpus as two different joints, the palpus, including the white ring at the base, will be four-jointed, as is usual in Coleopterous larvæ. Behind this must have been concealed the internal jaw of the maxillæ, which I did not see, as it was much retracted in the interior of the mouth during the life of the animal, and I was not able to make a better examination after the death of the creature, having unfortunately lost it.

The smaller piece between the two trunks of the maxillæ, is the mentum of the under lip, a triangular scale, with the pointed end behind, and the base in front. At this end are attached the three-jointed labial palpi, and between them the very small oval tongue or ligula. Each palpus has, like the antennæ, a soft white basal joint, and two slender horny joints, the last being a very thin point at the end of the palpus. The ligula be-

tween them was likewise soft, not horny, but not entirely white, thus differing from the basal joints of the antennæ and the palpi.

The body of the larva is not perfectly cylindrical, but rather depressed, having an elliptical outline, and without a sharp margin; it is of a soft fleshy consistence, with horny plates on each segment, these plates bearing the strong hairs or short bristles already described. The segment immediately behind the head is longer, rather trapezoidal, with curved margins, and entirely covered by a single horny plate; the two following segments are the shortest of all; the following segments almost imperceptibly increase in length, till we come to the last, which is somewhat trapezoidal, being much attenuated posteriorly, where it emits the anal tubus, which serves as a short, very mobile, accessory organ of movement.

On the three segments, which correspond to the thorax of the imago, are attached three pairs of rather long, but thin (and very active) legs, each composed of five different joints (fig. 4, magnified). The first joint is the stoutest, and articulated to the body near the middle of the underside of each segment; it is directed backwards and somewhat outwards, reaching as far as the end of the segment. After this first joint, corresponding to the coxa of the perfect insect, follows the short, oblique, truncate trochanter, and then the cylindrical femur, which is the longest joint of all; articulated to its end is the rather shorter and thinner tibia, terminating in a single mobile hook, which corresponds to the tarsus and unguis of the imago.

No other particular external organs are visible except the spiracles, which form nine black dots on each side of the body:—the first on the prothoracic segment, near the margin, behind the first pair of legs; the other eight on the fifth to twelfth segments, immediately before the outer margin of the horny dorsal plates.

The animal was brought to me by a friend, who had taken it in rotten wood; it moved about very actively, defending itself from all attacks by its rapid movements, opening its sharp-pointed mandibles, and closing them instantly if any object was submitted to its bites; it perforated with ease the skin of my fingers. In its movements it turned the end of the body against the enemy, slinging it from side to side, and ejecting from the anus a clear reddish-brown fluid, which had a corrosive effect upon my skin. During all this time it was emitting light, visible even in full daylight, but which was of course more perfect during the night,



as I had preserved the animal living in my room under a drinking-glass. This light, which the animal can intensify or diminish at will, was of two different colours.

At the head is emitted an entirely red light, like a burning coal; but on the body the light was greenish white, like that of the glowworm, or of phosphorus. Sometimes, when the animal had been disturbed, the light was so strong that I could observe the whole figure of the animal perfectly well during the night, if I took it in my hand and looked at it through a lens. I then observed that the light of the body was not homogeneous, but was arranged in ten points of light on each side of the body, corresponding to the incisions between the segments. I saw also a small luminous spot behind the dorsal plates in the soft skin connecting them. The segment behind the head and that preceding the anal tube, both which are covered with undivided horny plates, had no luminous points; but the connecting skin between the head and the next segment also emitted a bright red light. By this arrangement of ten luminous points on each side of the larva, when seen from a little distance on a dark night it appears as twenty small points of greenish-white light, of the size of the head of a strong pin, arranged in two parallel rows, and following a larger point of red light placed centrally in front of the two rows.

This larva lived for some days in my room, amongst pieces of rotten wood, but did not feed or change to the chrysalis state: it was lost through the negligence of my servant, who took the glass from the table to clean it; so I am perfectly unacquainted with the imago it would have produced.

Having regard to the general figure of this larva, more especially to the configuration of the head and the oral organs, I have no doubt that it belongs to the light-giving genus *Pyrophorus*, of the family *Elateridæ*. The larvæ of this group of Coleoptera have the same general form, the cylindrical or oval-cylindrical body (whence some have acquired the familiar name of wire-worms), and generally the stronger horny skin and the same construction of the mouth; especially the peculiar form of the trunks of the maxillæ united with the mentum agrees perfectly with these organs in the luminous larva in question.

Many larvæ of this family have been well described and figured by Bouché, Lequin, Perris, Westwood, and others (*see* Lacordaire, *Hist. Nat. des Coléoptères*, tom. iv. p. 134), all agreeing



in the principal characters which I have here described from my luminous larva. As the only luminous insects which occur in this country belong to the *Pyrophori* and *Lampyridæ*, I feel tolerably certain that this larva belongs to *Pyrophorus*, because the larvæ of *Lampyridæ* have a broader, softer, and flatter body, and their oral parts must be smaller, at least in those of this country, none of which exceeds an inch in length. But the largest *Pyrophorus* from the Argentine Republic (*P. punctatissimus*, Bl. Candèze, Monog. iv. p. 17) is  $1\frac{1}{2}$  inch long, and bears the same proportion to my larva that the large larva of *Agrypnus fuscipes*, described by Lequin, bears to the imago-state of *Anthia sexguttata*, (Guérin, Mag. de Zool. 1832, ix. 41). Indeed this larva has many points of resemblance to the larva here described; but it belongs to another group of the *Elateridæ*, in which the larva has the anal tube retracted and covered by the preceding elongated segment, which bears the form of a strong denticulated horny fork.

My larva agrees with others of the same family in the projecting anal tube and the unarmed preceding segment, like that of *El. sanguineus*. Erichson mentions a larva of *Pyrophorus* from Cuba (Wiegmann's Archiv, 1841, tom. i. p. 87), and says that the body is softer, more fleshy, and the segments are more separated—characters which agree very well with the construction of my larva; but he also mentions that the last segment bears many small humps, which I certainly did not notice in my specimen. This may, indeed, be a specific character, and not a generic one.

The conclusion at which I have arrived is therefore this—that the luminous larva observed by Azara, Ogilvie, and myself is that of *Pyrophorus punctatissimus*.

With reference to Mr. Murray's *Astraptor illuminator*, it appears to me not to be a larva of one of the *Elateridæ*, but rather to be that of one of the *Lampyridæ*. The figure given of the mouth shows none of the characters of a larva of *Elateridæ*, but agrees far better with the structure of the larva of the *Lampyridæ*. This view is also supported by the retracted head, the depressed form of the body, the sharp lateral margin, and the distinctly separated segments, which form, on each, projecting angles before the union with the adjoining segment; all these are characters distinctive of the *Lampyridæ* larvæ.

Buenos Ayres, April 25, 1871.

## On the Origin of Insects. By Sir JOHN LUBBOCK, Bart.

[Read November 2, 1871.]

THE metamorphoses of this group have always seemed to me one of the greatest difficulties of the Darwinian theory. In most cases the development of the individual reproduces to a certain extent that of the race; but the motionless, imbecile pupa cannot represent a mature form. Fritz Müller considers that the wingless Blattidæ probably most closely represent the original insect stock; Hæckel is inclined rather to the Pseudo-Neuroptera. I feel great difficulty in conceiving by what natural process an insect with a suctorial mouth like that of a gnat or butterfly could be developed from a powerfully mandibulate type like the Orthoptera, or even from the Neuroptera. M. Brauer has recently suggested that the interesting genus *Campodea* is, of all known existing forms, that which probably most nearly resembles the parent insect stock. He considers that the grub form of larva is a retrograde type, in which opinion I am unable to concur, though disposed to agree with M. Brauer on the first point. M. Brauer, in coming to this conclusion, relies partly on geological considerations, partly on the fact that larvæ more or less resembling *Campodea* occur among widely different groups of insects. I think there are other considerations which offer considerable support to this view. No one, so far as I know, has yet attempted to explain, in accordance with Mr. Darwin's views, such a life-history as that, for instance, of a butterfly, in which the mouth is first mandibulate and then suctorial. A clue to the difficulty may, I think, be found in the distinction between developmental and adaptive changes, to which I called the attention of the Society in a previous memoir. The larvæ of insects are by no means mere stages in the development of the perfect animal. On the contrary, they are subject to the influence of Natural Selection, and undergo changes which have reference entirely to their own requirements and condition. It is evident, then, that, while the embryonic development of an animal in the egg gives an epitome of its specific history, this is by no means the case with species in which the immature forms have a separate and independent existence. Hence, if an animal when young pursues one mode of life, and lives on one kind of food, and subsequently, either from its own growth in size and strength, or from any change of season, alters its habits or food,

however slightly, it immediately becomes subject to the action of distinct forces: natural selection affects it in two different and, it may be, very distinct manners, gradually leading to differences which may become so great as to involve an intermediate period of change and quiescence.

There are, however, peculiar difficulties in those cases in which, as among the Lepidoptera, the same species is mandibulate as a larva and suctorial as an imago. From this point of view, however, *Campodea* and the Collembola (*Podura*, &c.) are peculiarly interesting. There are among insects three principal types of mouth:—first, the mandibulate; secondly, the suctorial; and, thirdly, that of *Campodea* and the Collembola generally, in which the mandibles and maxillæ are retracted, but, though far from strong, have some freedom of motion, and can be used for biting and chewing soft substances. This type is intermediate between the other two. Assuming that certain representatives of such a type found themselves in circumstances which made a suctorial mouth advantageous, those individuals would be favoured by natural selection in which the mandibles and maxillæ were best calculated to pierce or prick, and their power of lateral motion would tend to fall into abeyance; while, on the other hand, if powerful masticatory jaws were an advantage, the opposite process would take place.

There is yet a third possibility—namely, that during the first portion of life the power of mastication should be an advantage, and during the second that of suction, or *vice versâ*. A certain kind of food might abound at one season and fail at another, might be suitable for the animal at one age and not at another: now in such cases we should have two forces acting successively on each individual, and tending to modify the organization of the mouth in different directions. It will not be denied that the ten thousand variations in the mouth-parts of insects have special reference to the mode of life, and are of some advantage to the species in which they occur. Hence no believer in Natural Selection can doubt the possibility of the three cases above suggested, the last of which seems to explain the possible origin of species which are mandibulate in one period of life and not in another. The change from the one condition to the other would no doubt take place contemporaneously with a change of skin. At such times we know that, even when there is no change of form, the temporary softness of the organs often precludes the

insect from feeding for a time, as, for instance, is the case with the silkworm. When, however, any considerable change was involved, this period of fasting would be prolonged, and would lead to the existence of a third condition, that of the pupa, intermediate between the other two. Since other changes are more conspicuous than those relating to the mouth, we are apt to associate the pupa-state with the acquisition of wings: but the case of the Orthoptera (grasshoppers &c.) is sufficient proof that the development of wings is perfectly compatible with continuous activity; so that in reality the necessity for rest is much more intimately connected with the change in the constitution of the mouth, although in many cases no doubt the result is accompanied by changes in the legs, and in the internal organization. It is, however, obvious that a mouth like that of a beetle could not be modified into a suctorial organ like that of a bug or a gnat, because the intermediate stages would necessarily be injurious. Neither, on the other hand, for the same reasons, could the mouth of the Hemiptera be modified into a mandibulate type like that of the Coleoptera. But in *Campodea* and the Collembola we have a type of animal closely resembling certain larvæ which occur both in the mandibulate and suctorial series of insects, and possessing a mouth neither distinctly mandibulate nor distinctly suctorial, but constituted on a peculiar type capable of modification in either direction by gradual changes without loss of utility.

Before concluding, I must say a few words about the probable nature and origin of the wings. Whence are they derived? why are there normally two pairs? and why are they attached to the meso- and metathorax? These questions are not less difficult than interesting. It seems to me that the wings of insects originally served for aquatic and respiratory purposes. From the various modes by which respiration is effected among the different groups of aquatic insects, we are justified in concluding that the original insect stock was, like *Campodea*, a land-animal. But in aquatic insects there is a tendency to effect the purification of the air through the delicate membranous covering of more or less foliaceous expansions of the skin. In the larva of *Chloëon*, for instance, which singularly resembles *Campodea*, several of the segments are provided with such foliaceous expansions, which, moreover, are in constant agitation, and the muscles of which, in several remarkable points, resemble those of the true wings. It



is true that in *Chloëon* the vibration of the so-called branchiæ is scarcely, if at all, utilized for the purpose of locomotion; the branchiæ are, in fact, placed too far back to act efficiently. The situation, however, of these branchiæ differs in different groups; indeed it seems probable that originally there would be a pair on each segment. In such a case those branchiæ which were situated near the centre of the body, neither too much in front nor too far back, would serve the most efficiently as propellers. The same causes which have determined the position of the legs would affect the wings also. Thus a division of labour would be effected; the branchiæ on the posterior segments of the thorax would be devoted to locomotion, those on the abdomen to respiration. This would tend to increase the development of the thoracic segments, already somewhat enlarged to receive the muscles of the legs.

That wings may be of use to insects under water is proved by the very interesting case of *Polynema natans*, which I discovered in 1862, and which uses its wings to swim with. This, however, is a rare case; and it is possible that the principal use of the wings was, primordially, to enable the mature forms to pass from pond to pond, thus securing fresh habitats and perhaps avoiding in-and-in breeding. If so, the development of wings would tend to be relegated to a late period of life; and by the tendency to the inheritance of characters at corresponding ages, to which Mr. Darwin has called attention\*, the development of wings would be associated with the maturity of the insect. Thus the late acquisition of wings in the Insecta generally seems to be itself an indication of their descent from a stock which was at one period aquatic in its habits, and which probably resembled the present larvæ of *Chloëon* in form, but had thoracic as well as abdominal branchiæ.

If these views are correct, the genus *Campodea* must be regarded as a form of remarkable interest, since it is the living representative of a primæval type from which not only the Collembola and Thysanura, but the other great orders of insects have all derived their origin.

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\* Origin of Species, 4th ed. pp. 14 & 97.



On the Formation of British Pearls and their possible Improvement. By ROBERT GARNER, F.L.S.

[Read December 7, 1871.]

THE formation of these beautiful ornaments has been more written about than really investigated,—written about, indeed, from Pliny downwards, and with a misapprehension of their real origin which is extraordinary, when it might have been easily explained by a little closer observation. Confining ourselves to British pearls, some of which (from the *Alasmodon* of our mountain-rivers) nearly equal the oriental ones in beauty, but including the very inferior ones from the *Mytilus* or edible mussel of our shores (the origin of which has been more especially studied), it is not difficult to convince ourselves that they are due to the existence, in the shell-secreting mantle of the animal, of minute parasitical entozoa, fully developed distomes, against which the natural protection which the mollusks have is a calcifying process around the parasites; and as after this they still act as foreign bodies, a continuation of the same process leads to the formation of pearls. It is fair to conclude that oriental pearls are formed in an analogous way; and in many other mollusks similar distomes, which are sometimes calcified, are seen. These distomes are so small as to be only just visible to the naked eye; and they always abound in the mussel which contains pearls. They may be found covered with a shelly layer so thinly as to appear quite unchanged in appearance, and to be known as incipient pearls only by pressure revealing the shelly envelope; they may sometimes be found still living, but partly covered with calcareous deposit; and, lastly, by the use of dilute acid, the young pearls may be seen to have each one or more distomes, or their remains, as a nucleus. The above was made out some years since independently; but from a *brochure* since obtained, written by Signor Antonio Villa, it would appear that others in Italy have suspected the same thing. Such is the common origin of the pearls which are found free in the mantle of the mollusks; but pearly excrescences attached to the inner surface of the shell may very likely arise from other irritants. Thus in the common *Anodon* the presence of a minute *Acarus* (*Atax*), at least the half-developed animal, appears to produce little pearly elevations on the retral side of the inner surface. In *Alasmodon* there is often a cluster of small pearls in the mantle just behind the anterior adductor muscle; but we can-

not positively affirm that in that bivalve, or, indeed, in *Unio* or *Anodon*, the pearls arise from the same exciting cause, although in the last two genera we have found them together. We are not certain what is the early life-history of the distomes; but in *Unio* the foot is sometimes found distended with capsules or mother cells, each one containing several distomes.

The above account of the matter the writer gave at one of the Meetings of the British Association, at least the principal facts; and he is not aware that it has ever been contravened. He would now proceed a little further in the subject, with a utilitarian aim.

Attempts have been made to force the mollusks to produce these pearls at the will of the experimenters. And, first, might not the *Alasmodon* of our rivers be cultivated like the salmon, so as to become more plentiful and possibly more entitled to its name *margaritiferus*?—many gravelly and rapid streams (the Dove, for instance, in its upper course) being apparently well suited for it, and having neither this species nor any of its representatives. Secondly, it has been supposed that a morbid state of the animal is more favourable to the production of pearls, or, in our view, more favourable to the generation of the distomes; and could not that be brought about by a transfer, or some such contamination of the water as the Chinese are said to practice? Thirdly, could not the *Alasmodon* be forced to form pearls by carefully introducing foreign bodies between the mantle and the shell, not as Linnæus is said to have done, by breaking or boring the shells, but by prizing them a little open and so introducing such bodies? The people just alluded to, we should suppose, so introduced the metallic or shelly nuclei, thus producing the well-known pearly excrescences resembling Buddha, as well as large pearls. We have had no opportunity of operating on the *Unio* or *Alasmodon*, though they may be kept alive for a long time under a tap; but we have made a few trials on the common *Anodon*, and present the specimens. Our plan was to prize open the valves a little, separate the mantle from the valves, and then introduce several pearls from the common *Mytilus*, in the hope that they would become coated with a layer of brighter nacre. In two months the pearls had become adherent to the shells—and in three, more or less increased by coats of nacre. As I before said, with the true British pearl-mussel I have not been able to make the trial. Réaumur and Linnæus seem to have failed with experiments of this kind; but other trials might be more successful,

and we ourselves should be rather sanguine that by introducing the common pearls within the valves of the true pearl-mussel we should obtain good pearls. Lastly, is it possible to *improve* the mean-looking pearls produced in such quantities in some localities in the edible mussel? We have made a few experiments in this last direction; and though we have not made our fortune or taken out a patent, we have found that they really may be much improved by chemical means, some made quite ornamental. The method we have tried is boiling the pearls for a short time in a dilute solution of potash and afterwards letting them remain in it for a few days, noting that a very strong solution destroys their lustre instead of increasing it. These inferior pearls have been collected for sale for many years in the lower Conway; and we think it possible that they are afterwards submitted to some such process. The pearls which are obtained from the *Alasmodon*, between Llanrwst and Bettws-y-coed, are very different and need no such treatment; in fact some of those found have fetched a high price, and they appear to wear better than oriental pearls.

Late in August of this year I examined a dozen *Alasmodons*; none of them had the ova transposed to the branchiæ, though they were ejecting them from the oviducts. The pericardium could be made out to communicate with the suprarenal sacs, as Professor Rolleston, I think, was the first to ascertain. In the depth of the foot of the *Anodon*, at some distance before and below the pedal ganglion, is a little yellowish-brown body about the size of a mustard-seed, of a waxy consistence and formed of several *emboîtures*. We should consider this to be a rudiment of a byssus-gland rather than of the organ of hearing. There is also a curved band of yellowish thickened mantle below the hinge, which requires explanation.

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Note on a Chinese Artichoke Gall (mentioned and figured in Dr.

HANCE's paper "On Silkworm-Oaks") allied to the European Artichoke Gall of *Aphilothrix gemmæ*, Linn. By ALBERT MÜLLER, F.L.S.

[Read February 15, 1872.]

FROM the valuable "Supplementary Note on Chinese Silkworm-Oaks," by Dr. H. F. Hance (Journ. Linn. Soc. Botany, vol. xiii. No. 65) I select for consideration the following passages, which are of special interest as affording the first intimation of the occurrence of a cynipideous oak-gall new to science:—

"The larger trees, producing acorns, are called *Siang-li* (the generic name for the oak), whilst those that are smaller and do not produce acorns are called *Ts'ing-kang*. In its stem and foliage the *Ts'ing-kang* is altogether similar to the *Siang-li*; but the colour of its leaves is a lighter green, and its flowers less abundant" (p. 9). . . . "The *Ts'ing-kang* tree grows on hills interspersed with the *Tsiang-li* oak trees, being in fact of the same kind, but devoid of flowers and fruit. A green ball is frequently found developed at the extremity of its twigs, consisting of hairs as fine as the silky fibres of the *Tsung* tree (qu. a palm?), but somewhat tougher. . . . The plate annexed to the above description, a copy of which is here [*vide* p. 11] given, represents an oak with leaves like those of a shallow-lobed form of *Quercus robur*, and with three fruits (unless they are intended for the 'oak-apple' mentioned in the text), one distinctly stalked, the dense squamæ of the cupule entirely concealing the acorn, and looking like those of *Q. dentata*, Thunb., though closely appressed instead of being more or less reflexed" (p. 10).

"The oaks are never allowed to grow old here [Thong-kin-foo]; every eight or nine years they are cut down to the ground; the subterranean trunks throw up new shoots, which are again cut down after the lapse of another eight or nine years, so that the oak woods are merely copses" (p. 12).

Britain and China lie far apart; but, botanically speaking, the genus *Quercus* is a good link between the two countries. It is therefore worth while pointing out that with the aid afforded by the life-history of a British *Cynips* the extracts given above bear witness to the existence of a closely allied Chinese insect. What my friend Mr. Riley, the State entomologist of Missouri, properly styles "unity of habit," points out the way. Since it has come to pass in Britain and on the continent adjoining that oaks are felled wholesale, and are almost everywhere replaced by copsewood, which has sprung up from their roots, an axillary excrescence called, from its resemblance to an artichoke, the "Artichoke Gall" has made its appearance in enormous numbers on the young oak-shoots. It is the cradle of a cynipideous fly named *Aphilothrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig). The numbers of this insect in Britain are now so great in some parts that they threaten to render many bearing oak trees altogether sterile. The parasitic Hymenoptera appointed to keep this *Cynips* in check are now altogether insufficient in numbers to cope with its rapid increase



fostered, as the latter is, by man ever more and more extending the area of action in the destruction of timber and consequent growth of copses. Early in summer the female deposits its eggs in the axillary fruit-buds; in doing so it shows a decided preference for stunted or otherwise unhealthy bushes or undergrowth; but where its numbers are once great, full-grown trees become equally liable to infection. Each infected fruit-bud gradually assumes the form of a hop-bloom or artichoke-like excrescence, consisting of a series of elongated squamæ (representing the converted cupule) and centring on a short woody basal axis, the top of which is occupied by the stunted acorn. The squamæ generally conceal the acorn, which in this condition is only 6-7 millimetres in length, with a diameter of about 3 millimetres. By the end of September or beginning of the following month, the acorn having done duty for an "inner gall," drops out of its foliaceous covering. If it be examined at this time, the interior will be found to be converted into a spacious cell filled by the large white fat larva of the *Cynips*. In spring this larva changes to a sculptured pupa, which in early summer assumes the perfect winged state and then quits the acorn. In cases where a parasitic Hymenopteron has deposited its egg in the cynipideous egg or very young larva, the acorn remains very small (seed-like), and but seldom preserves its normal shape.

Réaumur knew these galls, and has described and figured them (*Mémoires*, t. iii. p. 463, tab. 43 & 44), and has been followed by numerous other observers; but I have ventured to refer to my own observations in preference, so as to bring out the salient points between the European and the Chinese species. I dismiss the notion of calling this latter gall an "oak-apple;" the two productions have not the slightest resemblance.

Turning now to its affinities with the "*galle en artichaut*" of Réaumur, I venture to call attention to the following points.

#### European form.

On *Quercus pedunculata*, *sessiliflora*, and *pubescens*; prefers young copsewood and stunted trees.

Exceedingly common. Axillary, sometimes at extremity of twigs. Shape of an artichoke or foliaceous

#### Chinese form.

On "*Ts'ing kang*," an oak with light-green leaves, in outline like those of a shallow-lobed form of *Q. robur*; on trees kept artificially in the copse-state.

"Found frequently developed." At extremity of twigs. "Green ball," but figured as a foliaceous cone.



## European form.

cone. Colour, first green, then brown. Sometimes stalked.

Dense squamæ, representing converted cupule; generally concealing the acorn.

Squamæ closely appressed in the earlier stage of growth, less so when mature.

Acorn stunted, standing upright on a central axis. Acorn converted into a capacious larval cell, dropping to the ground in autumn.

Insect. *Aphilothrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig).

## Chinese form.

"One distinctly stalked."

"Dense" squamæ ("of the cupule"?) entirely concealing the acorn. (No cupule is visible in the figure.)

Squamæ looking like those of *Q. dentata*, Thunb., though closely appressed, instead of being more or less reflexed. (The figure does not show them closely appressed.)

No evidence. (No acorn visible in the figure.)

Insect not known. *A Cynips?*

I have not taken any notice of the different Chinese localities whence the above facts were procured. The European *Cynips* has an extensive range; and its Chinese ally is not likely to be worse off in this respect.

It now behoves the residents on the spot to prosecute this inquiry; the naturalist at home has done his share by calling attention to the matter.

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On the Geographical Distribution of the Diurnal Lepidoptera as compared with that of the Birds. By W. F. KIRBY, Assistant in the Museum of the Royal Dublin Society, author of 'A Catalogue of Diurnal Lepidoptera,' &c.

[Read February 15, 1872.]

THE preparation of my 'Catalogue of Diurnal Lepidoptera' has furnished me with materials for a paper on the general distribution of the group, which I have hitherto always shrunk from attempting. It happens that the number of species recorded slightly exceeds that of the number of birds as estimated by Dr. Sclater\* in his paper "On the general Geographical Distribution of the Members of the Class Aves" (Journ. Linn. Soc. Zool. vol.

\* Gray now enumerates upwards of 11,000 species; but it is more convenient to take Sclater's estimate in the present paper.

ii. pp. 130–145), but approaches it so nearly as to render a comparison between the Rhopalocera and the Aves extremely easy as well as interesting (birds, Sclater, 7500; butterflies, Kirby, 7700).

Had I been dealing with Lepidoptera only, I would certainly have united Dr. Sclater's "Palæarctic Region" and "Nearctic Region;" for although the species of North-American Rhopalocera are seldom identical with those of northern Asia and Europe, still the genera are the same with scarcely an exception, except a few representatives of South-American genera, which have no more right to be considered Nearctic species than the similar chance representatives of African forms in North Africa or South-west Europe, or of Indian forms in South-east Europe, have to be considered Palæarctic species. But for purposes of comparison it will be better to adhere to the geographical provinces mapped out by Dr. Sclater, commencing with:—

### I. *Palæarctic Region.*

"*Extent.*—Africa north of the Atlas, Europe, Asia-Minor, Persia and Asia generally north of the Himalaya range, upper part of Himalaya range? [certainly the north-west Himalayas], Northern China, Japan, and the Aleutian Islands. Approximate area of 14,000,000 square miles."

*Characteristic forms.*—*Erebia*, *Cœneis* (circumpolar), \**Melanargia*, *Satyrus*, *Epinephile*, *Hipparchia*, *Cænonympha*, \**Triphysa*, *Argynnis*, *Melitæa*, \**Araschnia*, *Vanessa*, \**Nemeobius*, *Lycæna*, \**Thestor*, *Plebeius*, \**Læosopis*, \**Zephyrus*, \**Leucophasia*, \**Gonepteryx* (sect. typ.), *Colias*, \**Zegris*, \**Euchloë*, \**Mesapia*, \**Hypermnestra*, \**Doritis*, *Parnassius*, \**Sericinus*, \**Thais*, *Thymelicus*, \**Erynnis*, *Hesperia*, *Carterocephalus*.

The above are all genera which may without any doubt be considered highly characteristic of the Palæarctic region, many being entirely confined to it, and others, though widely distributed, reaching their maximum of size and colour within its boundaries. The genera marked with an asterisk do not, with the doubtful exceptions of *Gonepteryx* and *Erynnis*, extend to the Nearctic region; nor, except *Gonepteryx* and *Zephyrus*, which extend to the Himalayas, do they so much as touch the Indian region. Although the genus *Plebeius* is widely distributed, yet it seems rather to belong to the Palæarctic fauna than to any other.

As is the case with the birds, the genera of *Rhopalocera*, characteristic of this district, are far from equalling many of the

splendid tropical forms in size and brilliancy: but, on the other hand, the number of peculiar forms is considerable; and the tropical representatives of boreal genera by no means surpass those of temperate regions; and I have myself observed that on comparing Indian and European representatives of the same species the Indian specimens are generally smaller, owing probably to the more rapid development of the larvæ in a warmer climate.

With regard to the peculiarities of distribution within the limits of the Palæarctic region, we have, first, the Arctic fauna, which is practically circumpolar; next the central fauna, stretching through the vast plains of Central Asia-Europe, and in which we may also include the Alpine fauna. The bulk of the central species are bounded to the south by the Alps and Pyrenees; and hence the fauna of Spain is much poorer than that of France, and that of Italy than that of Austria. South of the Alps, in Europe, we find the Mediterranean fauna, which has several little groups peculiar to itself. There is probably a south-central steppe fauna in Central Asia; but too little is known of that region to enable us to say more than that it produces several peculiar forms of high interest, *e. g.* *Hypermnestra*. The south-east of Europe is much richer in species than the south-west; for there are fewer obstacles to the southern spread of the central fauna in that direction.

Still it is difficult to account for the much greater number of species in East-central than in West-central Europe.

The Alpine species are scarcely represented at all in the mountains of the extreme south of Europe; and not a single truly Alpine species is yet known to occur in the mountains of North Africa. The extrinsic elements of the Palæarctic fauna consist, first, of isolated Nearctic and Indian forms in Japan and Mantchuria (*Midea*, *Papilio*, &c.); second, of a few Indian forms in Eastern Europe (*Neptis*, *Danaus*, &c.); and, third, in a few African forms in South Europe and North Africa (*Charaxes*, *Callosune*).

It is very difficult to estimate the real number of known species occurring in the Palæarctic region, on account of the division between this and the Indian region intersecting China and the Himalayas; but they may be set down as about 630\* at a very moderate computation. Dr. Sclater gives the area of the Palæarctic region as 14,000,000 square miles, and the number of spe-

\* Species occurring in more than one region are enumerated under both in this paper.

cies of birds as about 650, or one species for each 21,000 square miles. The proportion of butterflies is apparently somewhat less, being one species for each 22,222 miles. This is no doubt partly owing to incomplete observations, and partly to butterflies being, for various reasons, more local than birds. It appears, however, that butterflies are really less abundant in the Palæarctic region than birds; for Dr. Staudinger's last Catalogue, which takes in the whole district except Japan, Thibet, and North China, enumerates only 456 species, whereas Dr. Sclater enumerates 581 birds as inhabitants of Europe alone.

## II. *Æthiopian or Western Palæotropical Region.*

"*Extent.*—Africa south of the Atlas range, Madagascar, Bourbon, Mauritius, Socotra, and probably Arabia up to the Persian Gulf, south of 33° north latitude; an approximate area of 12,000,000 square miles."

*Characteristic forms.*—*Amauris*, *Gnophodes*, *Leptoneura*, *Bicyclus*, *Heteropsis* (Madagascar), *Cænynra*, *Acræa*, *Lachnoptera*, *Precis*, *Salamis*, *Crenis*, *Euxanthe*, *Amphidema*, *Pseudacræa*, *Catuna*, *Euryphene*, *Euphædra*, *Hamanumida*, *Aterica*, *Cymothoë*, *Meneris*, *Charaxes*, *Palla*, *Pentila*, *Liptena*, *D'Urbania*, *Axiocerses*, *Aphnæus*? *Capys*, *Phytala*, *Epitola*, *Hewitsonia*, *Deloneura*, *Pseudopontia*, *Belenois*, *Idmais*, *Teracolus*, *Callosune*, *Abantis*, *Ceratrichia*, *Leucochitonea*, *Caprona*, *Cyclopides*.

Africa possesses a great number of peculiar forms, which compensate in some measure for the absence of most of the characteristic Palæarctic or Indian genera, and for the very sparing manner in which most of the remainder are represented (by one or two species only): especially remarkable is the small number of *Satyrinæ* (barely fifty species) known to inhabit the Ethiopian region. Strange to say, Madagascar and the adjacent islands possess very few characteristic groups among the *Rhopalocera*. Nearly all the species belong to well-known African genera, and are in many cases identical with those of the mainland. The fauna of Africa and Madagascar has more affinity with that of India than with that of Europe, but is far more removed from either than they are from each other. I must not forget to allude here to the moth *Chrysidia rhipheus*, which, though a Mascarene insect, has no very close affinity to any Old-World species, but is nearest allied to the Tropical-American genus *Urania*\*. Similarly

\* Since the above was written, a second species of *Chrysidia* has been described from Zanzibar (*C. Cræsus*, Gerst.).



two species of *Hypanartia*, a Tropical-American genus, occur in Africa and Madagascar. South Africa is remarkably poor in species, and can hardly number more than 250. Most of the characteristic genera of Tropical Africa are entirely absent, or very poorly represented, though the number of species peculiar to Southern Africa is very considerable in proportion to the total. A summary of their geographical distribution is given by Mr. Trimen at the end of his '*Rhopalocera Africæ Australis*.'

Dr. Sc Slater estimates the birds of the Æthiopian region at 1250 species, or one species to 9600 square miles: but here the deficiency of known butterflies is still more remarkable than in the Palæarctic region; for they do not number more than 733, or one species to 16,400 miles nearly. It must be remembered, however, that a very small proportion of Africa has yet been explored entomologically; but the small number of species known from the best-explored portion (South Africa) proves beyond a doubt that its Lepidopterous fauna is extremely poor, although the greater portion of the species belong to genera almost peculiar to Africa. The insects of Africa are also extremely uniform in character, the same genera and often the same species occurring in localities so widely removed as Sierra Leone, Mozambique, and Natal.

### III. *Indian or Middle Palæotropical Region.*

"*Extent*.—India and Asia generally, south of Himalayas; Ceylon; Burmah; Malacca and Southern China; Philippines; Borneo; Java; Sumatra and adjacent islands: an area of perhaps 4,000,000 square miles."

*Characteristic forms*.—*Zophoessa*, *Lethe*, *Neope*, *Cœlites*, *Zethera*, *Ragadia*, *Yphthima*, *Melanitis*, *Amathusia*, *Zeuxidia*, *Discophora*, *Enispe*, *Clerome*, *Æmona*, *Thaumantis*, *Cethosia*, *Cirrochroa*, *Cynthia*, *Junonia*, *Rhinopalpa*, *Kallima*, *Amnosia*, *Hestina*, *Euripus*, *Penthema*, *Lebadea*, *Limenitis*, *Neptis*, *Athyma*, *Euthalia*, *Tanaëcia*, *Symphædra*, *Apatura*, *Charaxes*, *Dodona*, *Taxila*, *Miletus*, *Allostinus*, *Ilerda*, *Sithon*, *Deudorix*, *Liphyra*, *Amblypodia*, *Tachyris*, *Prioneris*, *Dercas*, *Calinaga*, *Teinopalpus*, *Leptocircus*, *Taractrocera*, *Tagiades*.

By far the richest district in the world, except South America. The principal characteristic forms are enumerated above; and these are almost, if not entirely, confined to the Indian region, though several have outlying representatives in Celebes alone—



an island whose relations are somewhat doubtful and peculiar, but which perhaps belongs rather to the Australian region than to the Indian (but compare Mr. Wallace's paper "On the Zoological Geography of the Malay Archipelago," Journ. Linn. Soc. Zool. iv. p. 172). On the other hand, India possesses numerous representatives of many Palæarctic and African genera; and many other genera are about equally divided between the Indian and African, or Australian, regions. A great similarity exists between the insects of North India and those of Singapore; the species peculiar to South India and Ceylon are imperfectly known at present, and a study of their affinities would no doubt be highly interesting and instructive. It may be expected, however, that the south of India is much poorer in species than the north, and would display African or Australian affinities rather than Palæarctic.

Although this fauna is very rich in comparison with any that have preceded it, still only 1250 butterflies are known from the Indian region, against 1500 birds; so that here also the birds are much more richly represented. Thus while in the birds we have one species to each 2600 square miles nearly, in the butterflies we have but one to 3200. Yet the zoology of the Indian region is far better known than that of any other, except the Palæarctic and perhaps the Nearctic.

#### IV. *Australian or Western Palæotropical Region.*

"*Extent.*—Papua and adjacent islands, Australia, Tasmania, and Pacific Islands; an area of perhaps 3,000,000 square miles."

*Characteristic forms.*—*Hestia*, *Ideopsis*, *Danaus*, *Euplœa*, *Hamadryas*, *Bletogona* (Celebes), *Argyrophenga* (New Zealand), *Xenica* (Australia), *Heteronympha* (Aust.), *Xois* (Fiji), *Acrophthalmia*, *Hypocysta*, *Tenaris*, *Hyantis* (Waigiou), *Messaras*, *Atella*, *Hypolimnas*, *Apaturina* (Amboyna), *Parthenos*, *Mynes*, *Prothoe*, *Dicalaneura*, *Lucia*, *Hypochrysops*, *Utica*, *Ialmenus*, *Ogyris*, *Elodina*, *Delias*, *Eurycus* (Aust.), *Ornithoptera*, *Netrocoryne* (Aust.), *Trapezites* (Aust.), *Hesperilla* (Aust.), *Euschemon* (Aust.).

The Australian region, although very rich in peculiar forms of Lepidoptera Heterocera, is poor in butterflies. It has much affinity to the Indian region, many genera, as *Euplœa*, *Danaus*, and *Papilio*, being pretty evenly divided between the two. On the other hand, the marked absence of most of the characteristic Indian genera, and the almost total absence of all forms characteristic of any other region, point out the Australian region as sufficiently distinct from any other.

Dr. Selater estimates the birds of the Australian region at 1000, or one species to every 3000 square miles; the number of butterflies is 725, or one to every 4138 miles.

#### V. *Nearctic or North-American Region.*

"*Extent.*—Greenland and North America down to centre of Mexico; area of perhaps 6,500,000 square miles."

*Characteristic forms.*—*Æneis* (circumpolar), *Grapta*, *Midea*.

The poverty of this region, as compared with every other, is most remarkable. Many of the characteristic forms of the Palæarctic fauna are absent in North America, although the Palæarctic region has representatives of every North-American genus except a few representatives of the characteristic forms of Southern America. The few genera mentioned above are the only ones in which the number of species is slightly greater than in the Palæarctic region.

While the number of birds in the Nearctic region is estimated at 660, or one in 9000 square miles, that of the butterflies is only 480, or not more than one in about 13,800 miles. It thus appears that though North America has so few characteristic forms, yet it is richer than the Palæarctic region in the number of its species as compared with its extent. It must be remembered, however, that this is owing partly to the sameness of the Palæarctic region, and partly to the European fauna being better known than the American, and to the slighter characters on which species are established by American Lepidopterists: 300 good species occur in Europe alone; and it may well be doubted whether America, east of the Rocky Mountains, produces more. California and Chili, though the former is necessarily included in the Nearctic and the latter in the Neotropical region, do not really belong to them, but are rather to be regarded as outlying portions of the Palæarctic region, many Palæarctic forms being represented in the New World in these districts only.

#### VI. *Neotropical or South-American Region.*

"*Extent.*—West-India islands, Southern Mexico, Central America and whole of South America, Galapagos Islands, Falkland Islands; estimated area of about 5,500,000 square miles."

I have found it expedient to credit the Neotropical region with the whole of the Mexican *Rhopalocera*; for all the described species, with very few exceptions, if we omit the species common to

Mexico and the United States, belong to purely tropical genera. On the other hand, Cuba and perhaps some of the other West-Indian islands have so strong an affinity in their productions to the Southern States of America, that the line should probably be drawn between two of them in the same way that Mr. Wallace draws the line between the Indo- and Austro-Malayan regions. Jamaica and Trinidad produce chiefly tropical forms; but in Haiti, and still more in Cuba, the northern and southern faunæ mix, with a preponderance of northern forms. The Nearctic region will probably prove to be somewhat richer than has been previously shown when the intermediate faunæ are better known, and the lines can be drawn with more accuracy. Little or nothing has been done in the West Indies, except in the four islands previously mentioned. The only butterfly known to me to inhabit the Galapagos Islands is a single species of the cosmopolitan genus *Plebeius* (*P. parrhasioides*, Wgr.), which genus, however, is badly represented in all the tropical and southern faunæ.

*Characteristic forms.*—*Ithomia*, *Mechanitis*, *Melinæa*, *Hætera*, *Cærois*, *Euptychia*, *Tisiphone*, *Oressinoma*, *Elina* (Chili), *Eteona*, *Lymanopoda*, *Calisto* (Antilles), *Pronophila*, *Corades*, *Bia*, *Morpho*, *Brassolis*, *Opsiphanes*, *Dynastor*, *Penetes*, *Caligo*, *Narope*, *Dasyophthalma*, *Colænis*, *Dione*, *Clothilda*, *Phyciodes*, *Chlosyne*, *Hypanartia*, *Napæocles*, *Anartia*, *Cybdelis*, *Eunica*, *Epiphile*, *Myscelia*, *Catonephele*, *Temenis*, *Dynamine*, *Catagramma*, *Callithea*, *Batesia*, *Ageronia*, *Didonis*, *Cystineura*, *Lucinia* (Ant.), *Pyrrhogyra*, *Megalura*, *Victorina*, *Adelpha*, *Aganisthos*, *Prepona*, *Agrias*, *Smyrna*, *Megistanis*, *Anæa*, *Hypna*, *Siderone*, *Protogonius*, *Lemoniidae* (all except the genera *Nemeobius*, *Dodona*, *Zemeros*, *Abisara*, *Taxila*, and *Dicallaneura*), *Thestor*, *Lamprospilus*, *Theorema*, *Eumæus*, *Trichonis*, *Peeute*, *Archonias*, *Hesperocharis*, *Dismorphia*, *Perrhybris*, *Leucidia*, *Daptonoura*, *Nathalis*, *Euryades*, *Thymele*, *Telegonus*, *Entheus*, *Pyrrhopyge*, *Erycides*, *Butleria*, *Pythonides*, *Achlyodes*, *Helias*.

Long as this list is, it is a mere selection of the overflowing riches of this district, which produces more than half of all the described species of Rhopalocera. Not only is every genus enumerated above (except *Thecla*, which is represented by a very few obscure species in Europe and North Asia), as well as all its allies, entirely confined to the New World, but the *Lycænidæ* and *Pierinæ* are less richly represented than the other groups.

The great majority are wholly unrepresented north of Mexico.

All the great cosmopolitan genera, such as *Papilio*, *Pieris*, *Eurema*, &c., are represented in South America by whole groups often of so much importance that they ought rather to be reckoned as genera than groups. Again, many genera, like *Apatura* and *Thecla*, which do not extend to Africa, are abundantly represented; while, on the other hand, *Catopsilia* and *Danaus*, almost purely tropical genera in the Old World, send out offshoots far into the United States. This, however, is a parallel case to the occurrence of Indian forms in Mantchuria, which in the west and centre of Asia-Europe are purely tropical.

The Neotropical region is far richer in Rhopalocera than in birds. Dr. Sclater estimates the birds at 2250 species, or one to each 2400 square miles; but the number of Rhopalocera already known is not less than 4200, which is about equivalent to a species to each 1310 miles. Nor is it likely that this enormous number would be materially affected by the uncertainty as to how much of Mexico should be included in the Neotropical region, as the greater part of the Mexican species are found in South America also.

I have not added a comparative Table of the number of birds and butterflies in each region, as there are a considerable number of species of the latter of doubtful locality not included in my summary, and this can be better done when future discoveries have enabled us to check the rough results already arrived at in a more perfect manner than is possible at present with our existing materials.

[The following Table was prepared to illustrate the reading of Mr. Kirby's paper, and is therefore added here.—H.T.S.]

	Birds.	Butterflies.
Total number of species .....	7500	7700
Europe, North Asia, Persia, Asia } Minor and North Africa .....	650	630
Africa, Central and Southern, Madagascar, &c. .... }	1250	733
India and Indian archipelago .....	1500	1250
Australia .....	1000	725
North America .....	660	480
South America .....	2250	4200



## Contributions towards a Knowledge of the Curculionidæ.

By FRANCIS P. PASCOE, F.L.S., late Pres. Ent. Soc.

## Part III.

(PLATES X., XI., XII., XIII.)

[Read June 20, 1872.]

## OTTISTIRA.

## (Brachyderinæ.)

*Rostrum* breviusculum, crassum, apice nudum; *scrobes* transversæ, infra oculum longe currentes, antice sulco longitudinali abbreviato instructæ. *Oculi* rotundati, aliquando frontales. *Scapus* clavatus, prothoracem fere attingens; *funiculus* 7-articulatus, articulo secundo sæpe primo sesquolongiore, ultimis subturbinatis; *clava* ampla, distincta. *Prothorax* rotundatus, lobis ocularibus nullis. *Scutellum* parvum. *Elytra* ampla, prothorace multo latiora. *Pedes* mediocres; *femora* modice incrassata, mutica (ex. *leucogenys* et *gibbosa*): *tibiæ* plerumque arcuatæ, posticæ rectæ, corbellis apertis; *tarsi* breves, articulo tertio ampliato; *unguiculi* basi connati; *coxæ* anticæ sejunctæ, intermediæ distantes (ex. *naso* et *punctata*). *Processus* intercoxalis late truncatus. *Propectus* brevissimum. *Abdomen* segmentis 3-4 brevibus.

The peculiar form and direction of the scrobes is but an exaggeration of what we find in *Sciaphilus*, *Strophosomus*, &c.; and, notwithstanding the breadth of the elytra at the base, it is near them, especially with the former, that I am disposed to place the genus. According to Lacordaire's Table, the anterior coxæ not being contiguous, it would fall under the "Pachyrhynchides." The species seem to be numerous, and scattered over the Malay archipelago from Singapore to New Guinea; but I have seen none that were not found by Mr. Wallace.

OTTISTIRA BISPINOSA. (Pl. X. fig. 6.) *O. variabilis*, subtestacea vel fusca, dense griseo- vel cinereo-squamosa, plus minusve saturate-nubulosa; rostro capite brevior, in medio lineatim sulcato; antennis testaceis; clava ovali, elongata; prothorace sat remote punctulato, fusco-bivittato; elytris convexis, fortiter sulcato-punctatis, punctis remotis, singulis postice in maribus spina valida obliqua juxta suturam armatis, interstitiis 3-5-7 elevatis; tibiis anticis arcuatis, reliquis subrectis. Long.  $2\frac{1}{2}$  lin.

*Hab.* Dorey; Aru; Mysol; Waigiou; Amboyna.



The female has only the slightest vestiges of spines on the elytra. A nearly allied species from Aru is without the raised lines on the alternate interstices.

**OTTISTIRA BICORNIS.** *O. picea*, dense griseo-squamosa, fusco nebulo-  
losa; rostro longiore; antennis subtestaceis; clava fusca, griseo-  
tomentosa, modice elongata; prothorace latitudine paulo longiore,  
utrinque pone medium paulo incurvato, sat confertim punctato, dorso  
subbivittato; elytris magis ampliatis, humeris obliquis, fortiter striato-  
punctatis, punctis approximatis, postice spinis duabus validis obliquis  
armatis; interstitiis tertio postice, quinto septimoque basi elevatis;  
pedibus anticis majusculis; tibiis anticis validis, arcuatis, intus basin  
versus longe pilosis, tibiis intermediis breviusculis. Long. 3 lin.

*Hab.* New Guinea.

I have only a single example of this species, which is very distinct from the preceding, having proportionally a larger prothorax, more closely punctured elytra, and very strong fore legs.

**OTTISTIRA PLANIDORSIS.** *O. ovata*, subtestacea, squamis griseis fuscisque dense tecta; capite inter oculos ad basin rostri breviter canaliculato; antennis testaceis, apicem versus infuscatis; articulis ultimis funiculi transversim subturbinatis; clava ovali, vix elongata; prothorace sat remote punctato, fusco bivittato; elytris dorso planatis, fortiter sulcato-punctatis, punctis remotis, interstitio quinto postice sensim elevato, apice rotundatis; corpore infra minus squamoso; tibiis arcuatis, posticis rectis. Long. 2 lin.

*Hab.* Batchian; Amboyna.

Well differentiated by the flatness of the elytra above, which is limited on each side by the elevated fifth interstice.

**OTTISTIRA OCULARIS.** *O. ovata*, picea, squamis griseis fuscescentibusque tecta; capite rostroque angustioribus, hoc haud sulcato; oculis antice approximatis; antennis testaceis; clava sat breviter ovali; prothorace latitudine longitudini æquali, sat leviter punctato; elytris anguste subcordatis, sulcato-punctatis, punctis linearibus, interstitiis modice convexis; tibiis anticis et intermediis arcuatis, posticis intus flexuosis. Long.  $1\frac{1}{2}$  lin.

*Hab.* Singapore.

The eyes are larger in this species, and only separated in front by a comparatively narrow space.

**OTTISTIRA PULCHELLA.** *O. ovata*, picea, squamis flavo-virentibus fuscescenti figuratis tecta; capite rostroque brevibus; oculis lateralibus; antennis fulvo-testaceis; funiculo breviusculo; clava breviter ovata; prothorace parum transverso, apice quam basi paulo angus-

tiore; elytris sat brevisculis, lateribus subparallelis, sulcato-punctatis, punctis oblongis, approximatis, interstitiis vix convexis; pedibus fulvo-testaceis; tibiis parce squamosis, anticis arcuatis, posticis rectis. Long.  $1\frac{1}{3}$  lin.

*Hab.* Morty; Macassar.

A pretty little pale-green species with brownish reticulate markings.

**OTTISTIRA LEUCOGENYS.** *O. ovalis*, nigra, squamis niveis condensatis maculatim decorata; capite inter oculos, genis rostroque supra niveo-squamosis; oculis magnis, antice approximatis; antennis pedibusque subferrugineis; scapo ad partem posteriorem oculi vix attingente; prothorace confertim granulato-punctato, supra gibboso; scutello albo; elytris oblongo-cordatis, nitidis, sulcato-punctatis, interstitiis valde elevatis, maculis niveis, singulis circa sex, ornatis; femoribus subtus leviter denticulatis; tibiis anticis et intermediis arcuatis. Long. 2 lin.

*Hab.* Sula.

A black species with pure white spots.

**OTTISTIRA GIBBOSA.** *O. subovalis*, fusca, squamis rufo-silaceis interrupte vestita, setulis nigris adpersa; rostro in medio longitudinaliter sulcato; oculis haud approximatis; antennis ferrugineis, scapo oculum haud superante; prothorace grosse punctato, supra valde gibboso; scutello nigro; elytris subcordatis, fortiter sulcato-punctatis, interstitiis valde convexis; femoribus subtus leviter denticulatis; tibiis posticis minus arcuatis. Long. 2 lin.

*Hab.* Malacca.

The elytra, owing to the disposition of the scales, have a mottled appearance. This and the preceding species are remarkable for their gibbous prothorax.

**OTTISTIRA NASO.** *O. subovata*, nigra, squamis aureo-viridulis plagiatis condensatis, setulis nigris adpersa; rostro antice gibboso, in medio longitudinaliter sulcato; oculis lateralibus; antennis fuscis; prothorace parum transverso, sat confertim modice punctato, lateribus viridulo; elytris subcordatis, striato-punctatis, interstitiis convexis, plaga communi mediana, et ad latera duabus aliis viridulis ornatis; tibiis præsertim anticis armatis. Long.  $2\frac{1}{4}$  lin.

*Hab.* Flores; Menado.

In this and the following species the rostrum is arched or gibbous just in front of the insertion of the antennæ.

**OTTISTIRA PUNCTATA.** *O. subovata*, nigra, sparse nigro-setulosa, squamis metallico-viridibus, præsertim circa puncta, vestita; capite rostroque ad latera viridibus, hoc antice gibboso; oculis lateralibus; antennis fuscis; scapo sensim clavato; prothorace parum longiore

quam latiore, sat vage punctato, lateribus viridulo; elytris subcordatis, sulcato-punctatis, interstitiis modice convexis, punctis viridi-marginatis; corpore infra viridi-squamoso; pedibus fuscis, griseo-squamosis. Long. 2-2½ lin.

*Hab.* Tondano.

### CYRTOZEMIA.

#### (Otiiorhynchinæ.)

*Rostrum* mediocre, basi transversim sulcatum; *scrobes* terminales, foveiformes. *Antennæ* tenues; *scapo* filiformi, apice clavato; *funiculo* articulo primo secundo triplo longiore, cæteris modice elongatis, gradatim brevioribus, ultimo clavo continuato, hoc elongato. *Oculi* rotundati, modice prominuli. *Prothorax* transversus, subcylindricus, basi apiceque truncatus. *Elytra* ovalia, basi prothorace haud latiora. *Femora* in medio incrassata, mutica; *tibiæ* arcuatæ; *tarsi* subæquales; *unguiculi* connati. *Coxæ* posticæ valde distantes. *Metasternum* longiusculum. *Abdomen* segmentis tribus intermediis subæqualibus. *Processus* intercoxalis latissime truncatus.

A genus allied to *Laparocerus*, remarkable for the widely separated posterior coxæ and consequently great breadth of the intercoxal process, and in other respects differentiated from it by the longer metasternum, the transverse basal groove of the rostrum, marking it off from the head, and the short foveiform scrobes. The tibiæ of the female are only very slightly curved.

CYRTOZEMIA DISPAR. (Pl. X. fig. 9.) *C. oblongo-ovata*, nigra vel fusca, sparse pubescens; rostro capite sesquilongiore, in medio tenuiter carinulato; prothorace utrinque paulo rotundato, supra confertim granulato; scutello parvo, triangulari; elytris ovalibus, striato-punctatis, punctis subquadratis, approximatis, interstitiis convexis, ♂ interstitio sexto excavato lateribusque, magis dense pubescentibus; corpore infra sparse squamuloso; metasterno, segmentoque primo abdominis (in utroque sexu) excavatis; pedibus longe pilosis; tibiis posticis apice pilis albidis dense fimbriatis. Long. 3¼-3½ lin.

*Hab.* India (Bombay).

### PSIDIOPSIS.

#### (Otiiorhynchinæ.)

*Rostrum* mediocre; *scrobes* breves, terminales, postice evanescentes. *Antennæ* longæ, tenues; *scapo* curvato, apice solo incrassato; *funiculo* articulis elongatis, primo longiore; *clava* distincta,

ovato-acuminata. *Oculi* breviter ovaies, verticales, grosse granulati. *Prothorax* cylindricus, basi apiceque truncatus. *Elytra* breviter ovata, valde convexa, prothorace basi haud latiora. *Pedes* intermedii minores; *femora* in medio incrassata, subtus dentata; *tibiæ* extus rectæ, intus flexuosæ; *tarsi* articulo primo modice elongato, sublineari; *unguiculi* liberi; *coxæ* posticæ approximatae. *Metasternum* breve. *Abdomen* segmento secundo ampliato.

Agrees in most respects with *Otiorhynchus*, so far as that genus with its 444 species can be characterized, but differing essentially in the approximation of its posterior coxæ, to which may be added its curved scape thicker only at the tip, and the cylindrical prothorax.

**PSIDIOPSIS FILICORNIS.** *P. nigra*, pube pallide grisea supra parce, infra pedibusque magis dense vestita; rostro supra tricarinato, interstitiis basi planatis, apicem versus excavatis; antennis ferrugineis, corpori longitudine fere æqualibus; prothorace paulo longiore quam latiore, leviter punctulato; scutello haud observando; elytris striatopunctatis, punctis rude impressis, interstitiis valde convexis, femoribus infra dente acuto instructis. **Long. 3 lin.**

*Hab.* Amazons.

#### TELENICA.

##### (*Otiorhynchinae*.)

*Rostrum* mediocre, capite continuatum, in medio tenuius; *scrobes* subapicales, supernæ, cavernosæ, postice cito evanescentes. *Oculi* rotundati, parum prominuli. *Antennæ* elongatæ; *scapus* rectus, ad marginem anteriorem prothoracis extendens; *funiculus* articulis duobus basalibus longioribus, cæteris obconicis; *clava* distincta. *Prothorax* transversus, utrinque rotundatus, basi truncatus. *Scutellum* nullum. *Elytra* ovata, humeris obsoletis. *Pedes* mediocres; *femora* incrassata; *tibiæ* intus flexuosæ; *tarsi* normales; *unguiculi* liberi, approximati. *Abdomen* segmentis 3-4 brevibus.

In the Australian fauna this genus may be placed between *Merimnetes* and *Myllocerus*; it has the rostrum of the former, but the free claws of the latter, from which it also differs in the straight scape, as well as from all the *Myllocerus* forms in the absence of the humeral angle. The second species here described has a very short metasternum; but I cannot find any other valid distinction of generic importance.

**TELENICA SUBLIMBATA.** *T. ovata*, nigra, sejunctim griseo-squamosa; rostro capite fere duplo longiore; antennis, tibiis tarsisque subferrugineis; prothoracis basi apice valde latiore; elytris indistincte seriatim punctatis, interstitiis planatis, uniseriatim setosis, pone medium fascia semilunari subfusca notatis, lateribus minus squamosis; metasterno longiusculo; corpore infra castaneo, squamis albis adperso. Long.  $1\frac{2}{3}$  lin.

*Hab.* West Australia.

**TELENICA NEBULOSA.** *T. breviter ovata*, nigra, argenteo fuscoque squamosa; rostro capite fere duplo longiore; antennis subferrugineis; prothorace basi minus latiore, indistincte vittatim fusco-vario; elytris brevibus, supra subdepressis, dorso, regione suturali excepta, fusco nebulosis, hac lateribusque subargenteis; tarsis ferrugineis; metasterno brevissimo. Long.  $1\frac{1}{2}$  lin.

*Hab.* West Australia.

#### ONYCHOPOMA.

(Otiiorhynchinæ.

Cum *Drepanodere* congruit sed *scapo* arcuato, dilatato, compresso, et *oculis* rotundatis.

The rostrum in the species described below, which varies considerably in coloration, is broad, shorter than the head, and transverse. The peculiarity of the genus lies in the dilated scape.

**ONYCHOPOMA PARDA.** (Pl. X. fig. 8.) *O. oblongo-ovata*, fusca, squamis griseis, plus minusve fusco-interruptis, vestita; rostro late transverso, supra manifeste tricarinato; scapo sat dense squamoso, quam funiculo longiore, hoc articulis quinque ultimis obconicis; clava breviter ovata; prothorace sat valde transverso, utrinque in spinam laminiformem, apice oblique truncato, producto; scutello rotundato; elytris tenuiter punctatis, punctis linearibus, supra fusco, vel aliquando fere obsolete, maculatim variegatis; corpore infra pedibusque griseo-squamosis; femoribus subtus dente parvo instructis. Long. 3 lin.

*Hab.* Cochín-China; Pegu.

#### TIMARETA.

(Otiiorhynchinæ.)

*Rostrum* breve, antice planatum, modice arcuatum, basi haud sulcatum; *scrobes* laterales, profundæ, ampliatae, oculos attingentes. *Antennæ* medianæ; *scapus* elongatus, gradatim incrassatus; *funiculus* 7-articulatus, articulis duobus basalibus, tribus ultimis



transversis; *clava* distincta. *Oculi* parvi, rotundati, grosse granulati. *Prothorax* ampliato-rotundatus. *Scutellum* obsoletum. *Elytra* oblonga, vel ovata (♀), prothorace paulo latiora, basi sinuata. *Pedes* mediocres; *femora* incrassata; *tibiæ* rectæ, intus sinuatæ, apice dilatatæ, posticæ corbellis apertis, resupinatis; *tarsi* modice elongati; *unguiculi* liberi, approximati; *coxæ* anticæ sejunctæ. *Metasternum* breve. *Processus* intercoxalis truncatus. *Abdomen* segmentis 3-4 brevibus, *sutura* prima arcuata.

This genus lies between *Trachyphlæus* and *Asceparnus*, and is differentiated by the form of its posterior tarsi. Individually the two species here described vary considerably in their markings; and, although very nearly allied, I have no difficulty in separating them at first sight.

**TIMARETA FIGURATA.** (Pl. XII. fig. 8.) *T. fusca*, sat dense squamulosa, setulis interjectis; antennis pedibusque subferrugineis, illis vage setulosis; capite inter oculos paulo incurvo; fronte depressa; prothorace latitudine parum longiore, albido squamuloso, fusco maculatim vario; elytris seriatim punctatis, interstitiis planatis, albido-squamulosis, in medio et ad latera plerumque fusco nebulosis, interstitio quarto sæpissime niveo, postice fascia lata communi conjuncto et plus minusve ad apicem currente; corpore infra fusco vel castaneo pilis squamulisque tecto. Long. 2 lin.

*Hab.* Swan River (Fremantle).

**TIMARETA SATELLINA.** *T. præcedenti* valde affinis, sed squamulis plerumque concoloribus, minoribus, minus approximatis, elytris longioribus, interstitiis paulo convexis, apice niveis. Long. 2 lin.

*Hab.* Fremantle.

**ATMESIA GLAUCINA.** *A. ferruginea*, supra squamulis griseis, viridulis intermixtis, dense tecta, subtus minus squamosa; fronte rostroque leviter longitudinaliter impressis; funiculo articulis duobus basalibus longitudine æqualibus; clava elliptica; prothorace transverso, utrinque fortiter rotundato, angulis posticis obsoletis; elytris ovalibus, subtiliter sulcatis, humeris obsoletis; pedibus ferrugineis sat sparse squamosis. Long. 2½ lin.

*Hab.* Western Australia.

This species is doubtfully referred to *Atmesia* on account of the form of the prothorax and elytra. The genus itself may probably be better placed in the *Leptopinæ*; but all my specimens having been gummed to paper, the characters of the mouth, owing to the gum, cannot be clearly seen.

**ACANTHOTRACHELUS ALBUS.** *A. subanguste ovalis, niger, squamulis albis dense vestitus, setulis numerosis interjectis; antennis nigris, sat dense albo-pilosis; oculis minusculis; prothorace valde transverso, postice paulo gradatim latiore, basin versus dente tenuato armato, basi ipsa fortiter bisinuata; scutello minuto; elytris elongato-subcordatis, basi prothoracis vix latioribus, seriatim oblongo-punctatis, apicibus rotundatis; corpore infra pedibusque albo-squamulosis.*  
 Long.  $3\frac{1}{2}$  lin. (rost. incl.).

*Hab.* Malabar.

The only other described species of this genus (*A. ventricosus*, Boh., from the Neilgherries) is differently coloured, and has the elytra shortly ovate and subglobose. I have another species from Rangoon.

### DYSTIRUS.

(Leptopinæ)

*Rostrum* robustum, angulatum, versus apicem incrassatum; *scrobes* arcuatae, infra et ab oculis desinentes. *Scapus* breviusculus; *funiculus* 7-articulatus, articulis quinque ultimis transversis, subæqualibus; *clava* adnata. *Oculi* ovati, liberi, infra acuminati. *Prothorax* transversus, utrinque calloso-dilatatus, lobis ocularibus distinctis. *Scutellum* invisum. *Elytra* ovata, prothorace haud latiora, angulis anticis obsoletis. *Femora* modice incrassata; *tibiae* rectae, posticae corbulis cavernosis; *tarsi* articulis tribus basalibus apice utrinque spinoso-productis, infra indumento squamoso vestitis; *unguiculi* liberi. *Abdomen* segmentis tribus intermediis æqualibus.

This genus appears to me to be most allied to the Australian *Leptops*, its chief differential character lying in the remarkable form of the prothorax, and the club closely attached to the funicle; the elytra also have no projection or tooth at the shoulder as in *Leptops*.

**DYSTIRUS STRUMOSUS.** (Pl. XIII. fig. 10.) *D. niger, ubique indumento squamisque griseis, unguiculis nitide nigris exceptis, tectus; rostro capite fere duplo longiore, supra longitudinaliter fortiter trisulcato; antennis squamosis, funiculi articulo primo breviter obconico, secundo brevior, clava articuloque ultimo funiculi nigris, pilosis; prothorace irregulariter grosse foveato, interspatiis callosis; elytris fortiter sulcato-punctatis, interstitiis modice convexis; corpore infra pedibusque squamis piliformibus adspersis.* Long. 5 lin. (rost. incl.).

*Hab.* Mexico.

**ENTIMUS ARROGANS.** *E. validus, niger, squamulis piliformibus griseis vestitus; antennis subnudis; prothorace confertim granulato, in medio sulcato; elytris trigonato-cordatis, subseriatis granulatis, granulis nitidis, magnitudine diversis, pone medium squamulis fasciatim condensatis, humeris obtuse callosis; corpore infra pedibusque sejunctim griseo-pilosis. Long. 12 lin.*

*Hab.* Panama.

The scales or, rather, hairs are, on the upper surface, in this species confined to the parts between the granules, but are more condensed at the sides; and behind the middle of the elytra they form a short band or band-like patch.

### IXODICUS.

(*Byrsopinæ.*)

*A Byrsope* differt *tibiis* apice exteriore haud productis; *tarsis* brevibus; et *elytris* rotundatis, postice haud truncatis. *Corpus* breve, validum, lævigatum.

The outline, absence of tubercles, or nearly so, and the minute concolorous scales, which leave the derm smooth and apparently naked, strikingly mark off this genus as a group quite distinct from *Byrsops*, although the technical characters are not perhaps so important. The species appear to be closely allied, requiring a large series of specimens to be properly worked out; but two of them, which may be taken as the extremes, are here described.

**IXODICUS OCCLUSUS.** (Pl. XIII. fig. 8.) *I. niger; rostro antice fortiter arcuato, basi vix elevato, punctis magnis leviter impressis remote notato; antennis ferrugineis; prothorace subquadrato, disco modice convexo, apicem versus utrinque oblique et profunde excavato, in medio obscure sanguineo, lateribusque vage determinate punctato; elytris utrinque rotundatis, fere impunctatis, carina laterali obsoleta, dorso pone medium manifeste depresso, singulis cristis duabus sanguineis prothorace projectis; pedibus sparse setosis; tarsis, præsertim anticis, articulis tribus basalibus valde transversis. Long. 3 lin.*

*Hab.* Cape of Good Hope.

**IXODICUS SORDIDUS.** *I. obscure niger, rostro antice fere recto, impunctato, basi transversim elevato; prothorace transverso, valde convexo, perparce punctato, pone apicem fortiter transversim postice longitudinaliter excavato, disco a lateribus angulatim limitato; elytris utrinque in medio parum parallelis, postice convexis, cristis basalibus minus prominulis, dorso a lateribus angulo crenato limitatis; tibiis setosis; tarsis angustioribus. Long. 2½ lin.*

*Hab.* Cape of Good Hope.

**EUOMUS RETUSUS.** (Pl. XIII. fig. 12.) *E. oblongo-ovatus*, niger, squamis (vel squamositate) umbrinis omnino dense tectus; rostro profunde sulcato, basi tuberculis oblongis instructo; funiculo subtenuato, articulo secundo quam primo duplo longiore; prothorace latitudine longiore, fortiter granulato, medio sulcato, lateribus angulato-tuberculato, lobis ocularibus valde productis; elytris oblongis, a basi ad apicem gradatim amplioribus, postice subito declivibus, subseriatim tuberculatis, singulis tuberculis in seriebus duabus elevatis, posterioribus majoribus instructis; pedibus nigro-setosis. Long. 5 lin.

*Hab.* West Australia.

One of the most distinct species of the genus, on account of the outline of the elytra.

**DIALEPTOPUS SERRICOLLIS.** *D. ♀ oblongo-ovalis*, niger, capite rostroque sat dense albo-squamosis; hoc latitudine vix sesquilongiore, antice bicarinato; antennis nigris; prothorace sat oblongo, fere esquamoso, cristis dorsalibus lateralibusque tuberculis conicis, apice plerumque setis duabus coronatis, munitis; elytris ovatis, dorso squamosis, tuberculis rubris conicis in seriebus duabus, singulis sex constitutis, apice sat late rotundatis, lateribus granulato-punctatis, sat dense albo-squamosis; corpore infra pedibusque castaneis, his nigro-setosis. Long. 6 lin.

*Hab.* Western Australia.

The male is probably narrower, or with parallel elytra, as in its congeners. This species is well differentiated by the small but prominent tubercles on the crests and sides of the prothorax, the latter appearing as if crenate or serrate. The tubercles on the elytra in the species of this genus can only be depended on approximately; occasionally one side has one more than the other.

**DIALEPTOPUS GRANULATUS.** *D. ♀ oblongo-ovalis*, niger, esquamosus, setulis tenuissimis ubique adpersus; rostro latitudine vix longiore, supra scrobes elevato; antennis piceis, breviusculis, clava brevi; prothorace haud cristato, apice valde producto, dorso granulato, utrinque angulatim dilatato, in medio lineatim longitudinaliter sulcato, lateribus infra vage tuberculato; elytris ovatis, supra versus basin granulatis, tuberculis conicis nigris in seriebus duabus, interiore tribus, exteriori sex, constitutis, apice sat late rotundatis, ad suturam submucronatis, lateribus rude granulato-punctatis; tarsis minus elongatis, linearibus. Long. 7 lin.

*Hab.* Western Australia.

**DIALEPTOPUS PLANTARIS.** (Pl. XII. fig. 11.) *D. ovatus*, niger, supra indumento incano tectus, squamulisque subtilissimis silaceis adpersus; rostro latitudine paulo longiore, vix carinato, antice utrinque uniseriatim punctato; antennis ferrugineis, clava ovali; protho-



race haud cristato, apice valde producto, dorso granulato, in medio profunde lineatim sulcato, utrinque angulatim dilatato, lateribus infra confertim granulatis; elytris subovatis, sat breviusculis, supra basin versus granulatis, tuberculis conicis incanis in seriebus duabus, singulis quatuor constitutis, apice sat late rotundatis, lateribus fortiter granulato-punctatis; corpore infra vittaque ad latera nigris; tarsis vix elongatis, intermediis et posticis articulo basali majore, tumido. Long. 6 lin.

*Hab.* Western Australia.

This species has the prothorax like the preceding; but, *inter alia*, it has much shorter elytra, the first joint of the intermediate and posterior tarsi swollen or enlarged, and the upper surface covered with a greyish crust.

### GEOBYRSA.

(Rhyparosominæ.)

*Caput* retractum; *rostrum* elongatum, arcuatum, ad basin quasi abscissum: *scrobes* foveiformes, obliquæ, ante medium rostri sitæ. *Scapus* clavatus, oculum attingens; *funiculus* 7-articulatus (at quasi 5), articulo primo crassiore, secundo longiore, cæteris subtransversis, ultimis duobus basin clavæ simulantibus (inde fun. quasi 5 art.). *Oculi* ovales, transversi, grosse granulati. *Prothorax* oblongus, basi apiceque æqualis, lobis ocularibus nullis. *Scutellum* nullum. *Elytra* ovalia, basi prothorace haud latiora. *Femora* in medio incrassata; *tibiæ* rectæ, ad apicem arcuatæ, apice ipso unguiculato; *tarsi* breves, angusti, articulo tertio bilobo; *unguiculi* simplices, divergentes; *coxæ* anticæ sejunctæ. *Pectus* apice late emarginatum. *Metasternum* modice elongatum. *Abdomen* segmentis tertio quartoque brevibus.

A narrow form resembling *Styphlus*, but with the elytra at the base not broader than the prothorax, to which they are closely applied, and the last two joints of the funicle forming the basal half of the club, the club itself being shortly conical; the line of separation, however, between the two joints is so indistinct that I am not sure that it really exists.

GEOBYRSA NODIFERA. (Pl. XIII. fig. 1.) *G. anguste oblonga*, nigra, squamulis griseis omnino dense vestita; rostro prothorace vix brevior, seriatim longitudinaliter remote squamoso; antennis squamulis raris dispersis; prothorace latitudine manifeste longiore, utrinque parum rotundato, supra postice depresso, subnodoso, nodis circa decem, scil. 4 apicalibus, 4 medianis, 2 basalibus; elytris nodis sub-



æqualibus, fasciculisque plurimis e setulis erectis formatis, munitis; femoribus sparse setosis, tibiis setulis curvatis seriatim instructis.

Long. 3 lin. (rostr. incl.).

*Hab.* Nicaragua (Chontales).

### OPHRYOTA.

(Rhyparosominæ.)

*Caput* exsertum, fronte planatum, supra oculos cristatum; *rostrum* crassum, apicem versus sensim angustius; *scrobes* flexuosæ, obliquæ, ab ore usque infra oculum currentes. *Oculi* minusculi, ovati, laterales. *Antennæ* subapicales; *scapus* oculum attingens; *funiculus* 7-art., articulo primo ampliato, secundo breviter obconico, cæteris transversis, ultimo clavam arcte applicato. *Prothorax* ampliatus, apice productus, lobis ocularibus nullis. *Scutellum* distinctum. *Elytra* prothorace manifeste latiora, lateribus parallela. *Pedes* mediocres; *femora* modice incrassata; *tibiæ* rectæ, apice mucronatæ; *tarsi* breves, articulis tribus basalibus latitudine æqualibus, tertio subbilobo; *unguiculi* simplices, divaricati; *coxæ* anticæ contiguæ. *Pectus* apice integrum. *Metasternum* breve. *Abdomen* segmentis 3-4 brevibus.

This genus is allied to *Zephyryne*, but is a stouter form, the club of the antennæ adnate to the funicle, the prothorax rounded, the metasternum short, &c. Mr. Masters tells me that it is found on the "Salt bush" in marshy places.

**OPHRYOTA SQUAMIBUNDA.** *O.* ovato-ampliata, picea, squamulis imbricatis murinis, umbrino plagiatis, dense tecta; capite inter oculos excavato, crista ad apicem rostri gradatim minus elevata, producta; rostro capite longiore, longitudinaliter gibboso, in medio sulcato; antennis squamulosis, setulis nigris adspersis; prothorace latitudine haud longiore, apice multo angustiore, rude subremote punctato, in medio leviter sulcato; elytris prothorace sesquolongioribus, ♀ magis latioribus, remote striato-punctatis, interstitiis convexis, alternis postice raro nodosis, apice late rotundatis, singulis plagis umbrinis quinque ornatis, *scil.* una basali macula prothoracis conjuncta, una obliqua ante medium, duabus pone medium fascias communes formantibus, una exteriore humerali; corpore infra pedibusque dense albido-squamulosis, his squamis longis interjectis; tarsis sparse nigro-setulosis; unguiculis testaceis. Long. 3 lin.

*Hab.* South Australia (Port Augusta).

**PANTOREITES VITTATUS.** *P.* rufo-brunneus, supra squamulis raris niveis, aliis condensatis vittas formantibus, vestitus; rostro piceo, squamulis adperso; funiculo articulis secundo tertioque æqualibus; prothorace

fortiter confertim punctato, disco niveo trivittato; scutello ovato, dense niveo-squamoso; elytris striato-punctatis, punctis majusculis, subquadralis, interstitiis convexis, vitta suturali integra, vittisque quatuor lateralibus plus minusve abbreviatis; corpore infra sat dense, pedibus niveo-squamulosis. Long.  $2\frac{3}{4}$  lin.

*Hab.* Australia.

The same narrowly obovate outline and general coloration characterize this as well as the other two species of the genus; but, whilst in them the sculpture is almost entirely masked by the more densely set scales, in the species before us they are so sparse as to appear to the naked eye, except when they are condensed to form the stripes, to be absent. The stripes are much more narrow and sharply limited, the sutural one forming a continuous line with the intermediate stripe on the prothorax; the four side-stripes are found on the fifth, sixth, seventh, and ninth interstices, counting from the suture. The denuded patch on the elytra of *P. scenicus*\* I find to be due to abrasion.

#### SAGINESIS.

(Hyperinæ.)

*Caput* exsertum; *rostrum* modice elongatum, arcuatum, basin versus angustius, longitudinaliter carinulatum; *scrobes* præmedianæ, obliquæ, infra oculos evanescentes. *Scapus* sensim incrassatus; *funiculus* 7-articulatus, articulis duobus basalibus longiusculis, cæteris subturbinatis; *clava* adnata, oblongo-ovalis. *Oculi* transversi, ovales, antice approximati. *Prothorax* subtransversus, lobis ocularibus nullis. *Scutellum* parvum. *Elytra* ampliata, humeris rotundatis. *Pedes* breviusculi; *femora* incrassata; *tibiæ* arcuatæ. *Cætera* ut in *Hypera*.

The habit of this genus is that of *Hypera*, from which it is differentiated principally by the scrobes; *Eurychirus*, with scrobes of the same character, has long legs and broad tarsi.

SAGINESIS LATIPENNIS. (Pl. X. fig. 4.) *S.* late ovata, fusca, squamulis grisescentibus, in elytris sparse maculatim albido variis, sat dense tecta; rostro capite duplo longiore, transversim subvage squamuloso; antennis subferrugineis; funiculo articulis duobus basalibus longitudine æqualibus; prothorace antice multo angustiore, utrinque rotundato, dorso albido bivittato; elytris basi prothorace duplo latioribus, supra regulariter modice convexis; seriatim punctatis, punctis oblongis; corpore infra pedibusque fusco-nebulosis. Long. 4 lin.

*Hab.* Aru.

\* Linn. Journ. Zool. vol. x. (1870), p. 463.

## CECHIDES.

## (Hylobiinae.)

*Rostrum* breve, crassum, capite continuatum; *scrobes* arcuatæ, subtransversæ, ab oculis remoti. *Antennæ* breves; *funiculus* quasi sex-, sed vere 7-articulatus, articulo ultimo ad clavam arcte applicato. *Oculi* rotundati, a prothorace valde distantes. *Prothorax* oblongus, subcylindricus, basi truncatus. *Scutellum* parvum, triangulare. *Elytra* prothorace multo latiora, oblonga, parallela. *Pedes* mediocres; *femora* modice incrassata, mutica; *tibiæ* arcuatæ, margine interiore dentes spiniformes gerente, apice unco transverso armatæ; *tarsi* normales; *unguiculi* divergentes. *Coxæ* anticæ contiguæ, intermediæ approximatae. *Pectus* longiusculum, antice late marginatum. *Metasternum* elongatum. *Abdomen* segmentis 3-4 conjunctim brevioribus, sutura prima arcuata.

The short thick rostrum of this genus would seem scarcely to warrant its location among the Hylobiinae, were it not for its obvious affinity to *Alphitopis*; indeed almost the only generic distinctions are this peculiarity and the distance of the scrobes from the eyes.

CECHIDES AMÆNUS. (Pl. XII. fig. 7.) *C. oblongus*, sat angustus, niger, supra albo-plagiatim silaceo-squamosus, granulisque nitidis vage notatus, subtus pedibusque squamis albo-argenteis dense tectis; rostro capite brevior; antennis ferrugineis, squamosis, clava nigrescenti-tomentosa; prothorace utrinque paulo rotundato, basi quam apice paulo latiore, silaceo-subbivittato; elytris fere obsolete sulcatis, basi, apice fasciisque duabus silaceis irregulariter plagiatim decoratis. Long.  $6\frac{1}{4}$  ln.

*Hab.* West Australia (Champion Bay).

## CYCOTIDA.

## (Hylobiinae.)

*Rostrum* cylindricum, modice tenuatum, paulo arcuatum, capite longius; *scrobes* obliquæ, infra rostrum desinentes. *Antennæ* præmedianæ; *scapus* sensim incrassatus; *funiculus* 7-articulatus, articulis 1-2 breviusculis, cæteris submoniliformibus; *clava* ovata, distincta, obsolete articulata. *Oculi* parvi, rotundati. *Prothorax* oblongus, subcylindricus, basi truncatus. *Scutellum* parvum. *Elytra* prothorace manifeste latiora, anguste elongato-

ovata. *Pedes* mediocres; *femora* parum incrassata, infra dentata; *tibiæ* intus bisinuatae, apice unco transverso armatae; *tarsi* normales; *unguiculi* divergentes; *coxæ* anticae contiguæ, intermediae approximatae. *Pectus* breve, antice emarginatum. *Abdomen* segmentis 3-4 conjunctim secundo longioribus; *sutura* prima recta.

A somewhat isolated form, which, in the Australian fauna, may be placed between *Alphitopis* and *Orthorhinus*, the rostrum, *inter alia*, differentiating it from both. The scales are peculiar, being deeply divided into six or seven hair-like branches; each of those on the prothorax arises from a puncture and is directed forwards; on the elytra they are very densely crowded together in lines.

CYCOTIDA LINEATA. (Pl. XII. fig. 6.) *C. angusta*, oblonga, nigra, omnino squamulis divisis niveis vestita; rostro nitido, lateribus utrinque irregulariter punctato, in medio longitudinaliter lævigato; antennis nitide nigris, clava opaca, tomentosa; prothorace basi quam apice angustiore, in medio linea nitida longitudinali notato, sat confertim punctato, punctis unisquamigeris; elytris lineis dense niveo-squamosis, alternis angustioribus nudis nitidis ornatis; unguiculis nudis, piceis. Long. 3 lin.

*Hab.* West Australia (Champion Bay).

#### NEMESTRA.

(*Eirrhiniinæ*.)

*Rostrum* mediocre, arcuatum, quadrangulare, a capite discretum, utrinque supra scrobes longitudinaliter excavatum; *scrobes* præmedianæ, obliquæ, infra oculos desinentes. *Oculi* rotundati, laterales. *Scapus* arcuatus, sensim incrassatus; *funiculus* elongatus, articulo primo duobus sequentibus conjunctim longiore, 3-7 obconicis; *clava* distincta, oblongo-ovata. *Prothorax* rotundatus, lobis ocularibus latis. *Scutellum* elevatum, subrotundatum. *Elytra* prothorace latiora, oblongo-cordiformia, humeris productis. *Pedes* mediocres, antichi majores; *femora* incrassata, mutica; *tibiæ* arcuatae, intus denticulatae, apice inermes; *tarsi* normales, sed articulo ultimo elongato; *unguiculi* liberi, approximati. *Metasternum* elongatum. *Abdomen* segmentis 3-4 brevibus.

The rostrum in this genus is quadrangular (*i. e.* in transverse section) nearly to the tip, and the angles are particularly prominent: this structure is foreign to the *Eirrhiniinæ*; and Lacordaire

would probably have instituted a "groupe" for its reception. In its habit, I think, the genus approximates unmistakably to *Aoplocnemis*. There are apparently three species, differing principally in outline; but one of them is somewhat intermediate; so, for the present, I regard them as belonging to one variable form.

**NEMESTRA INCERTA.** (Pl. XII. fig. 5.) *N. rufo-ferruginea* vel *nigra*, albo-cervino-vel subaureo-squamosa; capite rostrique dimidio basali crebre punctatis, puncto singulo squama alba repleto, hoc basi triangulariter excavato, dimidio apicali minus punctato; antennis ferrugineis, griseo-pilosis; prothorace utrinque ampliato-rotundato, vel vix ampliato, dorso valde vel modice convexo, crebre punctato, inter puncta plus minusve granulato, medio lateribusque basi subaureo-squamoso; elytris prothorace multo latioribus, humeris valde productis, obliquis, sulcato-punctatis, interstitiis granulis depressis sat remote uniseriatim instructis, marginibus exterioribus densissime albo-squamosis; corpore infra dense argenteo-squamoso; pedibus minus squamosis. Long.  $2\frac{1}{3}$ – $3\frac{1}{2}$  lin.

*Hab.* West Australia (Fremantle).

#### NEDYLEDA.

(*Eirrhiniinæ*.)

*Dorytomo* affinis, sed *tibiæ* anticæ rectæ, apice inermes; *coxæ* posticæ distantes; et *processus* intercoxalis late truncatus.

I follow Lacordaire in separating *Dorytomo*, Steph., from *Eirrhinus*, Schön., principally on account of the absence of ocular lobes; and probably division will have to be carried still further, even for the European species. To the above characters it may be added that the eye is unusually narrow and distant about its own breadth from the prothorax, finely faceted, and the claws are approximate.

**NEDYLEDA SEMIUSTA.** (Pl. XII. fig. 9.) *N. nigra*, elytris, basi exceptis, nitide fulvo-ferrugineis; rostro prothorace brevior, fulvo-ferrugineo, basi nigro; oculis anguste ovatis, a prothorace modice distantibus; antennis fulvo-ferrugineis, clava nigra; funiculo articulo basali valido, secundo breviter obconico, cæteris transversis; prothorace transverso, crebre punctato, subalbido-squamoso; elytris late ovatis, seriatim punctatis, interstitiis latis, planatis; corpore infra nigro, sat dense argenteo-squamoso; femoribus, apice exceptis, nigris, tibiis tarsisque fulvo-ferrugineis, parce albo-pilosis. Long.  $1\frac{1}{2}$  lin.

*Hab.* West Australia.

This and most of the species from West Australia described in this paper were collected by Mr. Duboulay of Champion Bay.



## NYCHIOMMA.

(Eirihininæ.)

*Caput* pone oculos elongatum. *Rostrum* robustum, cylindricum, capite brevius; *scrobes* subapicales, infra rostrum currentes. *Oculi* magni, grosse granulati, subrotundati, supra valde, infra minus, approximati, prothorace distantes. *Antennæ* scapo claviformi, gracili, medium oculi attingente; *funiculo* 6-art. brevi; art. primo incrassato, breviter ovato, cæteris transversis, in clavam continuatis. *Prothorax* subtransversus, utrinque rotundatus. *Elytra* subparallela, prothorace latiora. *Pedes* antici majores, intermedii minores; *femora* perampla, infra dente magno armata; *tibiæ* apice acuminatæ, anticæ arcuatæ; *tarsi* breviusculi, art. tertio lobato, ultimo modice robusto; *unguiculi* liberi; *coxæ* anticæ contiguæ, intermediæ approximatae. *Metasternum* modice elongatum. *Abdomen* segmentis duobus basalibus mediocribus, secundo 3-4 conjunctim brevior; *suturæ* rectæ. *Processus* intercoxalis subangustus, truncatus.

I am disposed to place this curious little genus near *Eugnomus*, Schön., on account of the elongation of the head behind and the scape impinging on the eye. The insect is remarkable for the size of this latter organ and the close approximation of one to the other in front.

NYCHIOMMA TESTACEA. *N.* subovata, omnino testacea, oculis fuscis exceptis, pube sparsa sericea subtiliter tecta; rostro parum arcuato, subtilissime punctato; capite glabro; prothorace impunctato, apice angusto, truncato, utrinque valde rotundato, basi integro; scutello triangulari; elytris sulcato-punctatis, apice rotundatis, clava antennarum longitudine articulis ultimis quinque conjunctim funiculi æquali. Long.  $1\frac{1}{4}$  lin.

*Hab.* Sarawak.

## PELIEBIA.

(Eirihininæ.)

*Rostrum* cylindricum, arcuatum; *scrobes* præmedianæ, laterales, margines anteriores ad medium oculorum attingentes. *Antennæ* graciles; *scapus* apice clavatus; *funiculus* 7-articulatus, articulo basali elongato, ultimis ovatis; *clava* basi attenuata. *Oculi* subrotundati, tenuiter granulati. *Prothorax* subcylindricus, antice angustior, lobis ocularibus distinctis. *Scutellum* puncti-

forme. *Elytra* prothorace haud latiora, basi reflexo-marginata, postice gradatim angustiora, apicibus caudata. *Pedes* tenuati; *femora* elongata, sublinearia, infra dente parvo instructa; *tibiæ* subrectæ, apice intus mucronatæ; *tarsi* breviusculi, dilatati, articulo ultimo elongato; *unguiculi* liberi, divaricati. *Coxæ* anticæ sejunctæ. *Pectus* modice elongatum. *Abdomen* segmentis duobus basalibus ampliatis.

An isolated genus, but having a marked resemblance to *Ectinura* (antè, xi. Zool. p. 170), but in regard to the direction of the scrobes not to be referred to Hylobiinae. It may be placed provisionally near *Aoplocnemis*, with which, however, I do not think it has much affinity. A few specimens were obtained by Mr. Buckley in his last expedition.

**PELIOBIA GENICULATA.** (Pl. XIII. fig. 3.) *P. oblongo-angusta*, nigra, squamosa, abdomine coxisque nitidis; capite inter oculos rude punctato; rostro piceo, prothorace sesquilongiore, basi et inter oculos fortiter carinato; antennis piceis, vage setosis; clava tomentosa; prothorace coriaceo, sparse nitide subgranulato, apice pallidiore, leviter emarginato; elytris basi depressis vel paulo excavatis, subtiliter seriatim punctatis, apicibus in processu conico valido terminatis; femoribus apice nitide rubris; tibiis intermediis et posticis apice extus setoso-marginatis. Long. 5 lin.

*Hab.* Ecuador (Macas).

**BELUS ANGUINEUS.** *B. elongatus*, subcylindricus, niger; rostro piceo; orbitis, linea in capite prothoraceque, et supra concinne maculatim niveo-squamosis; antennis nigris; prothorace longiore quam latiore, fortiter granulato; elytris ad apicem gradatim attenuatis, et paulo productis, ♂ pone humeros angustioribus, ad latera parum incurvatis, ♀ latioribus, lateribus parallelis, apicem versus minus elongatis; corpore infra dense niveo-piloso, maculis atris nudis notato. Long. 8-9 lin. (rostr. incl.).

*Hab.* West Australia (Nicol Bay).

Very like *B. irroratus*, Jek., but much narrower, especially the male, and the elytra slightly incurved at the sides.

**BELUS APHTHOSUS.** *B. elongatus*, subcylindricus, rufo-piceus, capite nigro, supra maculatim, subtus sat dense albido-pilosus; rostro prothorace sesquilongiore; antennis leviter pubescentibus; prothorace latitudine vix longiore, utrinque rotundato, confertim granulato, in medio subtiliter sulcato; elytris prothorace paulo latioribus, confertim rude punctatis, basi squamis magis condensatis, cæteris conspicue maculatis; lateribus perparum incurvatis, versus apicem cito angustatis, apicibus haud productis; corpore infra femoribusque sat dense albido-

squamosis; femoribus infra dente spiniformi instructis; tarsis fuscis. Long. 5-5½ lin.

*Hab.* South Australia.

Allied to *B. vetustus*, but shorter, the rostrum considerably longer, the femora with a spiniform tooth beneath.

**BELUS FARINARIUS.** *B. elongatus*, subcylindricus, rufo-piceus, supra granulatus, interrupte albido-pilosus; rostro prothorace vix longiore; antennis sat dense pilosis; prothorace latitudine vix longiore, postice utrinque ampliato-rotundato, in medio profunde longitudinaliter sulcato; elytris prothorace vix latioribus, parallelis, apice rotundatis; corpore infra pedibusque dense albido-pilosis, abdomine utrinque maculis quatuor nudis notato. Long. 5 lin.

*Hab.* West Australia.

Also allied to *B. vetustus*, but much shorter, the prothorax more rounded behind, the elytra less or not at all prolonged at the apex, &c.

**BELUS ACICULARIS.** *B. elongatus*, angustus, subcylindricus, rufo-lateritius, supra fere esquamosus; capite nigro, orbitis niveo-pilosis; rostro prothorace paulo longiore, nitido; antennis subferrugineis; prothorace utrinque paulo rotundato, confertim subtiliter granulato, lateribus sparse albo-pilosis; scutello dense albo-piloso; elytris basi prothorace paulo latioribus, pone humeros angustioribus, tunc fere parallelis, ante apicem gradatim angustatis, apicibus rotundatis, haud productis, omnino creberrime granulato-punctatis, sutura sola mere granulata; corpore infra mediocriter, pedibus rarissime niveo-pilosis. Long. 4-5 lin.

*Hab.* West Australia (Albany).

At first sight like *B. linearis*, but, *inter alia*, not so narrow, and the elytra not drawn out at the apex.

**BELUS PARALLELUS.** (Pl. XII. fig. 10.) *B. angustissimus*, parallelus, subnitide niger, pilis niveis, plurimis maculatim confertis, raro adpersus; rostro prothorace parum brevior; capite valde transverso; antennis breviusculis, nigris; prothorace oblongo, crebre subtiliter granulato; elytris prothorace fere quintuplo longioribus et paulo angustioribus, confertim rugoso-punctatis, apice rotundatis, haud productis; corpore infra dense albo-piloso; abdomine segmentis quatuor basalibus maculis tribus denudatis margine posteriore notatis. Long. 4 lin.

*Hab.* Western Australia (Champion Bay).

A remarkably slender species with a perfectly parallel outline. The figure very inadequately represents its extreme narrowness.

**RHINOTIA CORALLINA.** *R. lineari-elongata*, rubro-coccinea, pilis

subtilissimis parce adspersa, pectore abdomineque ad latera magis pilosis; rostro nitido, prothorace haud longiore; antennis apicem versus nigricantibus; prothorace ampliato-rotundato, valde convexo, confertim granulato-punctato, postice in medio longitudinaliter impresso; scutello transverso, longe albido-piloso; elytris prothorace haud latioribus, parallelis, apice rotundatis, crebre granulato-punctatis; femoribus anticis valde incrassatis. Long. 6 lin.

*Hab.* Western Australia (Nicol Bay).

This species is distinguished by its uniform coral-red colour when seen under a strong lens, and its more convex prothorax, without any, or with only a very fine trace, of the longitudinal ridges of nearly all its congeners.

### POLYDUS.

#### (Ceratopodinæ.)

*Rostrum* subvalidum; *scrobes* subterminales, obliquæ, marginem anteriorem oculorum infra desinentes; *funiculus* articulis duobus basalibus longioribus, reliquis transversis, gradatim incrassatis; *clava* ovalis, distincta. *Oculi* transversi, grosse granulati. *Prothorax* transversus, basi bisinuatus, lobis ocularibus distinctis. *Scutellum* rotundatum. *Elytra* prothorace parum latiora, pygidium obtegentia, basi reflexo-marginata, apice obtuse rotundata. *Pedes* antici majores; *femora* valida, infra dentata; *tibiæ* compressæ, arcuatæ, sulcatæ, anticæ intus bisinuatæ; *tarsi* normales; *unguiculi* bifidi. *Mesosternum* dentatum. *Meta-sternum* breviusculum. *Abdomen* segmentis duobus basalibus modice ampliatis; *sutura* prima arcuata, cæteris rectis.

The exponent of this genus has much the habit of a *Læmosaccus*; but, except for the shorter and stouter rostrum, the characters given above show that it is a member of the Ceratopodinæ, and an interesting addition to that limited subfamily.

**POLYDUS DUMOSUS.** (Pl. XIII. fig. 4.) *P. breviusculus*, rufo-fuscus, glaber, elytris rufo-brunneis; rostro prothorace parum longiore, paulo arcuato, omnino crebre punctato; antennis subtestaceis; funiculo breviusculo, articulo primo crassiore; prothorace fortiter transverso, utrinque rotundato, lineis obliquis subreticulatis munito; elytris subnitidis, leviter sulcato-punctatis, punctis remotis, interstitiis rugoso-granulatis: corpore infra pedibusque rufo-brunneis, parce griseo-pilosis, illo sat fortiter punctato; tibiis intermediis extus ad apicem dente obtuso instructis. Long. 3 lin.

*Hab.* Brazil (Bahia).

## ZEOPUS.

(Haplonychinae.)

*Haplonycho* et *Aolli* affinis; ab illo facile distinguitur funiculo 6-articulato, et tarsis 3-articulatis; ab hoc rostro elongato, arcuato; scrobibus postmedianis; funiculo articulis ultimis obconicis, distincte articulatis.

In *Haplonyx* and *Aolles* the rostrum is robust, straight or feebly curved, and the last three or four joints of the funicle are transverse and not very distinct from one another and from the club; from *Aolles*, to which this genus is more closely allied, from the absence of the claw-joint, the long curved rostrum with its postmedian scrobes will readily differentiate it. The species here described bears some resemblance to a *Storeus*.

**ZEOPUS STOREOIDES.** *Z. breviter ovatus*, modice convexus, rufo-brunneus, supra squamis silaceis, infra pedibusque griseis, sejunctim vestitus; capite modice exserto; rostro tenuato, fere longitudinis elytrorum, cylindrico, apicem versus subpiceo, sat vage punctulato; antennis ferrugineis, sparse squamulosis; scapo ab oculo sat longe terminato; funiculo articulo basali secundo duplo longiore, hoc tertio sesquilongiore, cæteris obconicis; clava distincta, ovali; prothorace longitudine duplo latiore, apice haud tubulato; scutello subcordiformi; elytris basi prothorace vix latioribus, striato-punctatis; dente femorali tenuato, longiusculo; tibiis, posticis exceptis, intus in medio angulatis. Long.  $1\frac{1}{2}$  lin.

*Hab.* South Australia.

**ACICNEMIS PARDALIS.** *A. elongato-ovalis*, nigra, variegatim griseo-squamulosa; rostro prothorace triplo longiore, ferrugineo, subtiliter punctulato; antennis ferrugineis; scapo antemediano; funiculo articulo secundo primo duplo longiore, cæteris primo longioribus, obconicis; clava elongata; prothorace vix oblongo, in medio gibboso-convexo et esquamoso, lateribus sparse granulato; scutello scutiformi; elytris elongato-cordatis, striato-punctatis, interstitiis convexis, remote nitide granulatis, circa scutellum macula media triangulari, aliisque minoribus dispersis nigris, notatis; corpore infra pedibusque griseo-squamulosis, plagis nudis variis; tibiis elongatis, in medio annulatis. Long.  $3\frac{3}{4}$  lin.

*Hab.* Java; Batchian.

Lacordaire was the first to characterize *Acicnemis*, in his 'Genera,' although its only representative up to that time had been previously described *specifically* by M. Fairmaire. This species (*A. variegata*, from Tahiti) is, according to M. Lacor-



daire, aberrant, his formula being drawn up from five or six others coming from Java, India, and Ceylon\*. Mr. Wallace found species in most of the islands he visited, from New Guinea to Singapore; and I have another from so far north as Japan. None have been found in Australia. A few only are here described. It is scarcely necessary to observe that the length of the rostrum varies more or less according to sex, and that an approximation is all that is attempted in the descriptions.

*ACICNEMIS SUBSIGNATA.* *A.* præcedenti affinis, sed minus variegata; rostro quam capite prothoraceque conjunctis vix longiore; articulis funiculi multo brevioribus; prothorace omnino griseo, squamulis minus imbricatis, antice multo angustiore; elytris subparallelis, granulis vix nitidis, et, præsertim, tibiis brevibus. Long. 3 lin.

*Hab.* Madras.

*ACICNEMIS PEDUNCULARIS.* *A.* oblongo-ovata, nigra, umbrino-squamosa, utrinque lineis duabus obliquis, alteraque pone medium elytrorum dense albo-squamosis: rostro quam dimidio corporis vix longiore, apice excepto, fortiter lineatim punctato; antennis ferrugineis; funiculi articulo secundo primo vix longiore, tertio obconico, cæteris moniliformibus, ultimo longiore; clava breviter ovata, basi fortiter pedunculata; prothorace oblongo-subconico, sat crebre profunde punctato, punctis squamositæ repletis, utrinque albido-lineato; scutello triangulari; elytris cordato-trigonatis, seriatim foveatis, interstitiis postice elevatis, humeris lateribusque albo-lineatis, pone medium linea transversa, aliquando ad suturam interrupta, notatis; corpore infra pedibusque dense umbrino-squamosis, setulis albidis adsperso; tibiis posticis elongatis, intus obsolete bisinuatis. Long. 3 lin.

*Hab.* Singapore; Sarawak; Java.

The shortly ovate club abruptly pedunculate at the base is strongly characteristic of this species.

*ACICNEMIS FRENATA.* *A.* elliptica, nigra, umbrino-squamosa, utrinque lineis duabus albidis pone medium elytrorum currentibus ornata; rostro dimidio corporis haud longiore, ferrugineo, triente basali fortiter lineatim punctato, reliquo lævigato; antennis ferrugineis; funiculi articulo primo longiore, 3.-6. moniliformibus, 7. ovato, tomentoso, duobus præcedentibus conjunctim longitudine æquali; clava elongato-attenuata; oculis modice approximatis; prothorace oblongo, subconico; scutello nudo, cordato; elytris cordato-trigonatis, striato-punctatis, interstitiis planatis, singulis in medio macula semilunari nigra, postice albo-marginata, notatis; corpore infra squamis griseis sejun-

\* M. Lacordaire has omitted to state that the scrobes are confluent beneath, although in some species there is a slightly elevated line between, not, however, really separating them.

ctim tecto; pedibus dense griseo-squamosis, setulis pallidioribus adpersis. Long. 3 lin.

*Hab.* Sarawak.

Allied to the preceding; but the club, shorter subcordiform elytra more closely punctured, and other characters will readily distinguish it.

**ACICNEMIS MERIONES.** (Pl. X. fig. 5.) *A. anguste ovata, fusca, dense griseo-squamosa, nigro maculatim varia, squamis patuliformibus elongatis erectis vage dispersis; rostro capite cum prothorace paulo longiore, dimidio apicali testaceo; antennis subtestaceis; funiculi articulo secundo primo paulo longiore; clava late ovata; prothorace oblongo, subcylindrico, confertim reticulatim punctato; elytris angustis, sulcato-punctatis, punctis oblongis; pedibus testaceis, posticis valde elongatis, femoribus nigro et albo annulatis.* Long.  $1\frac{1}{2}$  lin.

*Hab.* Batchian.

A small narrow species remarkable for the length of the peduncle of the posterior femora.

**ACICNEMIS PALLIATA.** *A. elliptica, dense pallide griseo- dorso fusco-squamosa, squamis spatuliformibus erectis adpersa; rostro capite cum prothorace longiore, basi fusco-squamosa, reliquo nitide ferrugineo, raro punctulato; antennis ferrugineis; funiculi articulo primo secundo brevior; clava late ovata; prothorace subconico, disco plaga subtriangulari fusca, ad apicem dilutior, notato; elytris basi lateribus subparallelis, sulcato-punctatis, plaga magna fusca bene limitata, postice angulato-terminata, ornatis; femoribus subnebulosis; tibiis dimidio basali tarsisque fuscis; tibiis posticis brevibus.* Long. 3 lin.

*Hab.* Japan.

The coloration and short posterior tibiæ are the prominent diagnostic characters of this species.

**ACICNEMIS PACHYMER.** *A. elliptica, fusca, silaceo-fuscescenti-squamosa; squamis spatuliformibus erectis, nonnullis nigris, adpersa; rostro dimidio corporis longiore, nitide piceo, basi squamosa; antennis piceis; prothorace subconico, utrinque rotundato, fere obsolete vittato; elytris elongato-cordatis, sulcato-punctatis, interstitiis convexis, rugosis; femoribus, præsertim posticis, valde incrassatis et fortiter dentatis; tibiis posticis brevibus, intus apicem versus dente acuto instructis.* Long. 4 lin.

*Hab.* Laos.

The angle at the inner edge of the posterior tibiæ, nearly wanting in some species, takes in this the form of a sharp tooth, and is placed not far from the apex. In the preceding its position is nearly the same, but it remains a mere angle.

**ACICNEMIS BREVIPENNIS.** *A. breviter ovata, nigra, maculatim albosquamosa; rostro, capite antice, tibiis tarsisque ferrugineis, illo dimidio corporis paulo brevior, et basi fortiter punctato; antennis breviusculis; clava brevi, ovata; prothorace ampliato-rotundato, convexo, crebre fortiter punctato; scutello minuto; elytris subglobosis, fortiter sulcato-punctatis, punctis singulis squama repletis, interstitiis sat latis, subplanatis; corpore infra femoribusque castaneis, illo sat confertim punctato. Long. 1-1½ lin.*

*Hab.* Batchian; Amboyna.

A short aberrant species, the femora long but less pedunculate; the intermediate and posterior coxæ more widely apart. The white spots are a little uncertain in their number, and occur chiefly on the anterior edge of the prothorax, and in a curved line behind the middle of the elytra.

### BERETHIA.

(Menemachinæ.)

*Ab Acicnemide differt femoribus brevioribus, haud vel vix pedunculatis, posticis corpus haud superantibus; abdomine sutura prima in medio obsoleta.*

A modification of *Acicnemis*, but sufficiently distinct. The typical species has short stout posterior tibiæ, strongly bisinuate on the inner edge. The second species has much of the style of coloration of *A. pardalis*.

**BERETHIA MEDINOTATA.** (Pl. X. fig. 3.) *B. oblonga, subplanata, nitide fusca, supra subnuda, infra femorumque basi dense albo-squamosa; rostro prothorace cum capite haud longiore, basi grosse crebre punctato; antennis subferrugineis, articulo secundo funiculi primo sesquilingiore; prothorace subtransverso, antice angusto, utrinque ad medium gradatim latiore, fortiter crebre punctato, punctis unisquamigeris; elytris prothorace multo latioribus, profunde sulcato-punctatis, interstitiis rugosis, apicibus mucronatis, sutura, apice excepto, nigris, macula media oblonga alteraque apicali, e squamis albis condensatis, notatis; tibiis tarsisque ferrugineis; illis albo-squamosis. Long. 3 lin.*

*Hab.* Ceram.

**BERETHIA SANNIO.** (Pl. X. fig. 2.) *B. oblonga, modice convexa, nigra, supra, femoribus tibiisque umbrino-squamosis albo nigroque variegatim notatis; rostro prothorace duplo longiore, apicem versus nitide subferrugineo, basi sejunctim griseo-squamoso; antennis subferrugineis, articulo secundo funiculi primo duplo longiore; prothorace latitudine parum longiore, sat crebre punctato, dorso albo bivittato; elytris leviter sul-*

cato-punctatis, albo maculatim bifasciatis, maculisque nigris indistinctis notatis; corpore infra griseo-squamoso; femoribus tibiisque albo subannulatis; tarsis subtestaceis, pubescentibus. Long. 3 lin.

*Hab.* Ceram.

### SEMELIMA.

(Menemachinæ.)

*Rostrum* basi cylindricum; *funiculus* articulis 3.—7. moniliformibus.

*Elytra* basi reflexo-marginata, ad prothoracem arcte applicata, humeris carentia. *Abdomen* segmentis duobus basalibus conjunctis; *sutura* prima obsoleta. *Femora* dente tenuato instructa.

*Cæteris* ut in *Acicnemide*.

The union of the two basal segments of the abdomen, and the obliteration of their suture are among the characters which distinguish the “*Ménémachides vrais*” from the “*Acicnémides*,” the two “*groupes*” into which Lacordaire has divided the subfamily; but, on the other hand, the presence of ocular lobes, and other characters appear to me show that this genus has a greater affinity to *Acicnemis*, hitherto the only one of the “*groupe*.”

SEMELIMA TRIANGULUM. (Pl. X. fig. 1.) *S.* elongata, nigra, opaca, supra lineis ochraceis tribus, e squamis condensatis, triangulum longulum formantibus; rostro basi rude lineatim punctato, apice lævigato; antennis ferrugineis, scapo antemediano; funiculo articulis duobus basalibus breviusculis, æqualibus, cæteris moniliformibus, ultimo ampliato; clava breviter ovata; prothorace oblongo, sat remote foveato, in medio bifasciculato, utrinque vittato; scutello minuto; elytris basi prothorace vix latioribus et usque ad tertiam partem gradatim latioribus, deinde cito angustioribus, apice rotundatis, seriatim fortiter foveatis, postice sulcatis, interstitiis alternis elevatis, singulis fasciculis duobus nigris munitis; corpore infra nitide nigro, punctis, squamis ochraceis repletis, adperso; pedibus parce griseo-setosulis. Long.  $3\frac{1}{2}$  lin.

*Hab.* Sarawak.

CHOLUS PULCHELLUS. *C.* subrhombicus, ater, nitidus, sulphureo-plagiatus; capite rostroque castaneis, illo sat vage punctato; antennis testaceo-ferrugineis; funiculi articulo primo duobus sequentibus conjunctim longiore; prothorace sat vage tenuiter punctulato, limbo antice utrinque sulphureo-squamoso; scutello obsoleto; elytris obconicis, remote seriatim punctatis, interstitiis lævigatis, subtilissime sparse punctulatis, dorso singulorum cavitatibus tribus majusculis squamis sulphureis repletis concinne ornato, *scil.* una basali, una pone



medium, altera apice approximata, et ad latera una media obsitis; corpore infra dense sulphureo-squamoso. Long. 3 lin.

*Hab.* Cayenne.

Allied to *C. Beschii*, Fhs., but, *inter alia*, with a finer and not deeply punctured prothorax, the punctate lines on the elytra more delicate and the intervals smooth. The next species differs also in sculpture, and in the manifestly shorter elytra. The three have the scutellum obsolete or nearly obsolete, and the spur on the anterior tibiæ much reduced\*.

**CHOLUS ÆMULUS.** *C. subellipticus*, castaneus, nitidus, elytris magis rufescentibus, supra citrino-plagiatus; capite crebre punctato; rostro antennisque rufo-castaneis; funiculi articulo primo tribus sequentibus conjunctim æquali; prothorace sat vage tenuiter punctato, limbo antico utrinque citrino-squamoso; scutello obsoleto; elytris brevioribus, obconicis, minus remote seriatim punctatis, punctis majusculis, interstitiis in certo situ transversim corrugatis, cavitatibus plurimis squamis citrinis repletis ornatis, *scil.* tribus majoribus ut in præcedenti, tribus lateralibus et duabus antemediis minoribus; corpore infra citrino-squamoso; pedibus rufo-castaneis. Long.  $2\frac{3}{4}$  lin.

*Hab.* Amazons.

\* Lacordaire considers that the numerous species included by Schönherr in *Cholus* ought, for the most part, to be excluded, to form several new genera. While, however, it is very far from being homogeneous, I can find no sufficient characters by which the species can be satisfactorily distributed into genera. On the contrary, while there is absolutely nothing to separate *Polydceres*, it seems to me almost impossible in some cases to distinguish *Archarias* from *Cholus*, the former differentiated, according to Lacordaire, by the intermediate segments of the abdomen being angulated at the sides; and therefore I have not adopted either of those genera. Nevertheless, after an examination of most of Schönherr's species and a large number of new ones, several of which are here described, I think it will be desirable to limit the genus, somewhat arbitrarily it may be, as nearly as possible to such species as possess the following characters:—(1) eyes round or oval, (2) scape barely reaching the eye, (3) club of the antennæ distinct, (4) anterior coxæ more or less widely apart, (5) anterior tibiæ unguiculated as well as mucronate at the apex. As to the ocular lobes, they are certainly present in *C. albo-cinctus* and some others, and bordered with vibrissæ, which partly cover the eye, while in other species (*parvus*, *undulatus*, &c.) there is not a trace of them, the eye resting at some distance from the prothorax. The femora, too, almost invariably thickened in the middle, are linear in *C. cinctus*, which is closely allied to *C. albo-cinctus*, in which they are in the normal state; but they are always furnished with a well-marked tooth beneath. The mesosternum, sometimes strongly produced (*laticollis*, *viduatus*, &c.), is generally simple; and there are gradations between the two. The outline, whether rhombic or elliptic, or oval, and the serration of the elytra posteriorly are characters, as it seems to me, of only specific value.



**CHOLUS BROMINUS.** *C. rhombicus*, rufo-fuscus, opacus, supra unicolor, lateribus prothoracis infra sternorumque dense albedo-squamosis; rostro basi usque ultra medium carinato, lateraliter sparse squamoso; antennis ferrugineis, funiculo breviusculo; prothorace subtilissime, haud confertim punctulato, punctulis unisquamulosis; scutello oblongo; elytris subcordatis, supra subplanatis, remote seriatim punctatis, inter puncta singula granulo minuto instructis, interstitiis mamillato-punctatis, punctulis squamulam minutam gerentibus, apice obsolete serratis; corpore infra squamis piliformibus adpersis; mesosterno antice fortiter producto; coxis anticis spina valida armatis. Long. 7 lin.

*Hab.* Peru (Quito).

Of a uniform dark chocolate-colour above, and apparently without scales, which are only seen under a strong magnifying-power. There is a similar spine on the coxæ of *C. undulatus*.

**CHOLUS UNIFORMIS.** *C. subellipticus*, in medio paulo depressus, rufo-castaneus, sejunctim silaceo-squamulosus; rostro apice fortiter dilatato; funiculi articulo primo duobus sequentibus sejunctim æquali; prothorace utrinque modice rotundato, granulis subcurvatis transversim vel oblique connexis munito; scutello subscutiformi; elytris basi prothorace paulo latioribus, lateribus irregulariter rotundatis, seriatim punctatis, antice transversim corrugatis, postice granulatis; corpore infra pedibusque squamis piliformibus silaceis, plurimis albidis intermixtis, sejunctim vestitis; mesosterno elevato, antice verticali; femoribus leviter incrassatis. Long. 5 lin.

*Hab.* Para.

For the present this species will be best placed after *C. inornatus*.

**CHOLUS NIVOSUS.** *C. oblongo-ovatus*, niger, nitidus, supra sparse niveo-squamosus, plurimis condensatis guttulas formantibus; rostro sat valde elongato, piceo; antennis piceis, clava ovata, acuminata; prothorace longitudine latitudini fere æquali, irregulariter punctato, interspatiis subtiliter transversim granulatis, utrinque niveo subvittato; scutello subscutiformi; elytris obovatis, transversim granulatis, guttulis numerosis notatis, apice crenatis; corpore infra pedibusque fusco-ferrugineis, illo niveo-squamoso, his squamis piliformibus dispersis. Long. 5 lin.

*Hab.* New Granada.

For the present this species may be placed after *C. irroratus*, Guér.

**CHOLUS ATOMARIUS.** *C. elongato-obovatus*, modice convexus, fusco-castaneus, squamis piliformibus flavidis conspersus, aliis normalibus maculatim irroratus; rostro rufo-piceo, basi apiceque vix crassiore;

antennis læte ferrugineis, clava nigra, funiculi articulo basali secundo fere duplo longiore; prothorace subtransverso, granulis ovatis nitidis sparse munito; scutello subscutiformi; elytris prothorace manifeste latoribus, seriatim punctulatis, inter puncta granulato-corrugatis, apice anguste rotundatis; pectore abdomineque lateraliter dense flavido-squamosis; femoribus sublinearibus. Long. 5 lin.

*Hab.* Venezuela.

Allied to *C. inornatus*, Fhs., but much narrower, and with nearly linear femora.

**CHOLUS DELUMBIS.** *C. oblongus*, subellipticus, niger, subtiliter griseo-squamulosus; rostro elongato, basi longitudinaliter acute angulato; antennis tenuatis; funiculi articulo primo secundo duplo longiore, reliquis subrotundatis; clava longe elliptica; prothorace depresso, irregulariter granulato, disco utrinque excavato, in medio antice carinato; scutello elevato, rotundato, lævigato; elytris supra valde inæqualibus, seriatim granulatis, in medio planatis, singulis interrupte bicarinatis, carina exterior ad humeros paulo prominula, sed vix dilatatis; femoribus haud incrassatis; corpore infra minus squamoso. Long. 9 lin.

*Hab.* Ecuador (Macas).

This species approaches the genus *Aphyorhamphus*, Guér., in its (slightly) prominent shoulders; but the mesosternum is not produced—a character, however, in this group of, I think, no generic value. *Cholus basalis*, Boh., should be referred to it.

**CHOLUS BUFONIUS.** *C. oblongo-ovatus*, dorso planatus, niger, sejunctim ochraceo squamulosus, prothorace elytrisque vitta laterali ochracea, e squamulis condensatis, ornatis; rostro basi modice, apice valde, dilatato; antennis piceis; prothorace utrinque subampliato-rotundato, basi fortiter bisinuato, irregulariter vage granulato; scutello transverso, conspicue nigro; elytris elongato-cordatis, remote seriatim punctulatis, vitta laterali utrinque granulis in seriebus duabus vel tribus marginata, seriebus exterioribus minutis, aliisque etiam dispersis; corpore infra pedibusque squamulis filiformibus vestitis, squamulis longioribus albis sparse interjectis; femoribus fere linearibus. Long. 7-8 lin.

*Hab.* Amazons.

The row of granules bordering the lateral stripe on each side gives a cariniform sharpness to that part of the elytra, which appears to be peculiarly diagnostic of this species.

**CHOLUS CALAMITA.** *C. sat late obovatus*, niger, opacus, supra subplanatus, vage sed fortiter granulatus, squamulis minutis piliformibus adpersus, vitta laterali, apicem elytrorum non attingente, e squamulis

flavidis paulo condensatis effecta; rostro basi parum, apice fortiter, dilatato; antennis rufo-brunneis, clava nigra, funiculo tenuiter setuloso; prothorace utrinque modice rotundato, basi truncato; scutello transverso, ruguloso-punctato; elytris subparallelis, prothorace multo latioribus, ad latera abrupte declivibus, apice obtuse rotundatis; corpore infra pedibusque obscure nigris, squamulis valde dispersis notatis. Long. 6 lin.

*Hab.* Brazil.

Somewhat resembling the preceding, but (*inter alia*) the granules on the elytra larger and less dispersed.

**CHOLUS SYCOPHANTA.** *C. subellipticus*, in medio paulo depressus, niger, corpore pedibusque sulphureo-squamulosis, nitide maculatis granulatis, capite prothoraceque vitta laterali squamulis densioribus; rostro nigro, nitido, basi carinato; scapo oculum haud attingente; funiculi articulo primo tribus sequentibus conjunctim æquali; prothorace utrinque paulo ampliato, confertim granulato; scutello nigro, esquamoso; elytris basi prothorace manifeste latioribus, subseriatim granulatis, seriebus alternatis minoribus; abdomine segmentis 3. 4. in medio denudatis; mesosterno antice oblique planato, postice margine anguste elevato; femoribus sublinearibus. Long. 11 lin.

*Hab.* New Granada.

This fine species in general appearance is like *Dionychus flavescens*.

**CHOLUS MIMETES.** *C. subellipticus*, supra parum depressus, niger, corpore pedibusque sulphureo-squamulosis, confertim nitide granulatus, vitta laterali in prothorace elytrisque e squamulis condensatis effecta; rostro nigro, nitido, basi subcarinato; antennis nigris; scapo oculum haud attingente; funiculi articulo primo tribus sequentibus brevior; prothorace utrinque vix ampliato, confertim granulato; scutello castaneo, esquamoso; elytris basi prothorace manifeste latioribus, granulis numerosis rufo-castaneis, plurimis confluentibus, minoribus interjectis, instructis; corpore infra ut in præcedente, sed pedibus magis tenuatis, femoribus sublinearibus. Long. 7 lin.

*Hab.* Nicaragua (Chontales).

Allied to the last, but smaller, with proportionally more slender legs, and granulation of elytra more dense.

**CHOLUS CURIALIS.** *C. anguste rhombicus*, modice convexus, rufo-piceus, silacco-squamosus, granulis nitidis confertim maculatus; rostro basi subreticulato-punctato; funiculi articulo primo secundo vix longiore; prothorace utrinque paulo ampliato, vitta laterali abbreviata, lateribusque infra cum jugulo squamis densioribus tectis; scutello squamoso, subscutiformi; elytris elongato-cordatis, subseriatim granulatis, maculis parvis ochraceis, plus minusve raris, irregula-

riter notatis; corpore infra pedibusque rufo-castaneis, squamis piliformibus vage vestitis; tarsis fulvescentibus. Long. 5 lin.

*Hab.* Nicaragua (Chontales).

This species is also allied to the two preceding, especially the latter, but is more convex, narrower behind, the granulations proportionally smaller, those on the elytra not confluent, and the scales beneath, except on the throat and sides of the prothorax, scattered and piliform.

**CHOLUS VIDUATUS.** *C. subrhombicus*, nitide niger, guttulis parvis, e squamulis niveis condensatis, exceptis; funiculo breviusculo; clava breviter ovata, obtusa; prothorace confertim mamillato-punctato, guttulis perpaucis dispersis; scutello oblongo, manifeste punctato; elytris subcordatis, confuse seriatim punctatis, tenuiter undulato-corrugatis, apice subtiliter crenatis; mesosterno fortiter elevato; femoribus granulis depressis instructis. Long. 8 lin.

*Hab.* Nicaragua (Chontales).

This species may be placed after *C. geniculatus*, Kirsch. (Berl. Ent. Zeit. 1869, p. 187).

**CHOLUS NITIDICOLLIS.** *C. oblongus*, omnino niger, guttulis niveis exceptis, supra nitidus; rostro basi bisulcato, scrobibus versus apicem incipientibus; scapo elongato, clava ovata; prothorace lævigato, pernitido; scutello subscutiformi; elytris subobconicis, remote seriatim punctulatis, singulis guttulis (circa 12) e squamis niveis in cavitatibus sitis, apice integris; corpore infra fere esquamoso; pedibus nitidis; mesosterno paulo producto. Long. 7 lin.

*Hab.* Bogota.

In coloration it resembles the preceding, but will be at once distinguished by its glossy prothorax.

**CHOLUS BUCKLEYI.** (Pl. XI. fig. 3.) *C. oblongus*, nitide niger, niveo guttatus, capite, rostro pedibusque, genibus nigris exceptis, rufo-fulvis; antennis nigro-ferrugineis, funiculo breviusculo; clava ovata, subacuminata; prothorace subtiliter punctulato, utrinque triguttato; scutello semicirculari; elytris subobconicis, remote seriatim punctulatis, cavitatibus majusculis plurimis squamis niveis repletis, ut in prothorace, decoratis, apice tenuiter serratis; corpore infra rufo-ferrugineo, sat dense citrino-squamoso. Long. 7 lin.

*Hab.* Ecuador (Canales).

A very distinct species, which I have dedicated to Mr. Clarence Buckley, whose two journeys into the interior of South America, proceeding from Guayaquil, resulted in the discovery of many novelties, especially in Lepidoptera.

**CHOLUS HÆMATOSTICTUS.** *C. subrhombicus*, niger, supra granulatus,

interspatiis sparse flavido-squamulosis, cavitatibus plurimis squamis miniaceis dense repletis; capite nigro, nitido, supra oculos rufo-squamoso excepto; antennis nigris, funiculi articulo primo duobus sequentibus conjunctim brevior; prothorace maculis quinque, duabus antice, tribus postice locatis; scutello oblongo-scutiformi, elevato; elytris subconicis, transversim granulatis, apice serratis, singulis maculis decem in series duas ordinatis; corpore infra dense flavescentsquamuloso; pedibus nigris, sparse squamulosis. Long.  $6\frac{1}{2}$  lin.

*Hab.* Bogota.

A fine species, with large orange-red or minaceous spots.

**CHOLUS LECIDEOSUS.** *C. anguste rhombicus*, omnino succineo-fulvus, nitidus, maculis parvis numerosis, e squamulis ochraceis formatis, aspersus; rostro paulo tenuato; antennis funiculi articulo primo duobus sequentibus conjunctim æquali, quatuor ultimis turbinatis, clava nigra; prothorace maculis plus minusve confluentibus; scutello ovato; elytris elongato-cordatis, seriatim punctatis, transversim subconnato-granulatis, apice crenatis; corpore infra maculatim albido-squamuloso. Long.  $4\frac{3}{4}$  lin.

*Hab.* Nicaragua (Chontales).

A very distinct species, which, in the absence of any affinities, may be placed after the last.

**CHOLUS NOTABILIS.** (Pl. XI. fig. 1.) *C. subrhombicus*, fuscus, squamis flavidis dense, aliisque rufo-fulvis magis sparse vestitus, illis plagas determinatas formantibus, *scil.* unam triangularem occipitalem, in prothorace tres, quarum unam magnam obcordatam in medio, in elytris quinque, quarum duas majores pone medium contiguas, et tres, unam communem, apicem versus sitas; prothorace plaga media sola sat sparse granulato; scutello subspatuliformi; elytris tenuiter striato-punctatis, apice integris; corpore infra dense albo-squamuloso; mesosterno postice calloso; pedibus rufo-ferrugineis, sparse griseo-squamulosis; tarsis aureo-fulvis. Long. 7-8 lin.

*Hab.* Amazons.

**CHOLUS PRÆTORIUS.** (Pl. XI. fig. 2.) *C. oblongo-ovatus*, ater, squamis flavidis dense, aliis aterrimis sparse vestitus, illis plagas determinatas formantibus, *scil.* in prothorace tres, quarum unam magnam triangularem, in elytris septem, duas scapulares, unam mediam fasciæformem transversam, tres apicales; capite nigro, fere squamoso; antennis nigris, funiculi articulis quinque ultimis transversis; prothorace plaga media sat sparse granulata; scutello subspatuliformi; elytris tenuiter striato-punctatis, apice integris; corpore infra flavido-squamuloso; mesosterno postice calloso; pedibus nigris; tarsis fulvis. Long.  $7\frac{1}{2}$  lin.

*Hab.* Panama.



In this and the preceding species the unguiculus, or hook, at the apex of each tibia appears to be absent; on close examination, however, it can be seen amidst the hairs which occupy that part of the tibia.

### ERETHISTES.

(Cholinæ.)

A *Perideræo* differt *lobis* ocularibus nullis, *tibiis* anticis haud unguiculatis.

Lacordaire has already pointed out that three of Schönherr's *Choli* have the characters of *Perideræus*, with the exception of the two given above; *Perideræus* itself is only separated from *Cholus* by the length of the posterior femora, which extend beyond the elytra. The three *Choli* to be referred here are *lateralis*, *tetricus*, and *silaceo-guttatus*; four more are described below, only one of which, *E. congestus*, can be said to have an obvious affinity to any one of the others (to *C. tetricus*, Fabr.). I have another species from Minas closely allied to the latter.

**ERETHISTES LEUCOSPILUS.** *E. anguste ovatus, nitide niger, infra dense albido-squamosus, prothorace nigro-olivaceo; elytris albo-plagiatis; capite rostroque basi griseo-squamosis; antennis ferrugineis; funiculi articulo primo duobus sequentibus conjunctim haud longiore, tribus ultimis transversis; prothorace antice multo angustiore, supra subgranulato, subtiliter punctulato; scutello scutiformi; elytris prothorace haud latioribus, sat fortiter seriatim punctatis, seriebus subapproximatis, singulis cavitatibus quatuor squamis albis repletis ornatis; pedibus nigris. Long. 5 lin.*

*Hab.* Cayenne.

Like *E. ochriventris* in outline, only a little narrower, but with a coloration after the style of *Cholus Kunzei*.

**ERETHISTES LICHENEUS.** (Pl. XI. fig. 6.) *E. anguste subrhombicus, totus niger nitidus, plagis ad latera albido-squamosis exceptis; rostro basi crassiore, in medio compresso; scrobibus ultra medium rostri haud extensis; scapo antennarum apicem versus sat fortiter arcuato; funiculo elongato; clava ovali; prothorace longitudine latitudini fere æquali, irregulariter sat confertim granulato, inter granula subtilissime mamillato-punctato (granulis etiam puncto singulo margine anteriore impressis); scutello transversim rotundato; elytris subconicis, remote seriatim punctulatis, subcorrugatis, singulis plagis duabus lateralibus, anteriore permagna, e squamulis flavidulis, margine densioribus, formatis, plaga simillima prothorace utrinque ornato; meso-*

sterno perparum producto; abdominis segmentis lateraliter macula flavidula squamosa decoratis. Long. 6 lin.

*Hab.* Ecuador (Sarayacu).

The femora in this species scarcely extend beyond the elytra; they are rather too much drawn up in the figure.

**ERETHISTES OCHRIVENTRIS.** *E.* anguste subrhombicus, nitide chalybeo-viridis, rostro apicem versus nigro, nitidissimo, subtus squamulis læte ochraceis dense tectus; antennis nigro-piceis, funiculi articulo primo duobus sequentibus conjunctim longiore, tribus ultimis obconicis, gradatim crassioribus; prothorace confertim granulato, fere esquamoso; scutello nigro, ovato; elytris seriatim punctatis, transversim granulatis; punctis subquadratis, squamulis albidis munitis; pedibus chalybeatis, tibiis posticis breviusculis, compressis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Venezuela (Santa Marta).

This and the following species were collected by the late Mr. Bouchard.

**ERETHISTES CONGESTUS.** *E.* subrhombicus, niger, nitidus, supra granulatus, submaculatim sparse albo-squamosus; antennis nitide piceo-nigris, funiculi articulo primo duobus sequentibus conjunctim longiore, quatuor ultimis sensim crassioribus; prothorace granulis majusculis, sat numerosis, nitidis notato; scutello triangulari; elytris granulis subundulato-transversis munitis; corpore infra albo-squamoso; tibiis posticis breviusculis, compressis. Long.  $3\frac{1}{4}$  lin.

*Hab.* Venezuela (Santa Marta).

#### ANÆNOMUS.

(Cholinæ.)

Characteres ut in *Cholo*, sed *capite* pone oculos ampliato; *rostro* tenuato, recto, basi abrupte curvato; *oculis* (rotundatis) fere rostro obsitis; *femoribus* posticis elongatis; *tibiis* brevibus, apice mucronatis, haud unguiculatis; *processu* intercoxali triangulari.

A curious form, especially in regard to the head; in its short tibiæ it resembles *Brachynemis*, but otherwise it is more nearly allied to *Cholus*.

**ANÆNOMUS RUBIGINEUS.** (Pl. XI. fig. 5.) *A.* oblongus, rufo-ferrugineus, squamis piliformibus albidis vage indutus; rostro elongato, apicem versus nitido, et fortiter dilatato; antennæ præmedianæ, scapo apicem versus arcuato, funiculi articulo primo tribus sequentibus conjunctim longiore; clava sat breviter ovata; prothorace subconico, transversim corrugato-granulato, squamis valde adspersis;

scutello rotundato; elytris breviusculis, prothorace basi paulo latioribus, lateribus modice rotundatis, sulcato-punctatis, punctis approximatis, squamis repletis, interstitiis valde convexis, apice late rotundatis; pectore paulo excavato, griseo piloso; femoribus apice, tibiisque etiam apice, tarsisque nigris, his articulo secundo minore. Long. 7. lin.

*Hab.* Brazil.

#### ASTYAGE.

(Cholinæ.)

*Cholo* affinis, sed *scapo* antennarum oculo impingente; *prothorace* conico, angulo postico acuto; et *tibiis* anticis haud unguiculatis.

The only exponent of this genus is an insect resembling in its coloration *Dionychus parallelogrammus*, Germ., but remarkable for the peculiar form of the prothorax.

ASTYAGE LINEIGERA. (Pl. XI. fig. 8.) *A. oblongo-ovata*, parum convexa, fusco-castanea, flavido-squamosa; rostro parum arcuato, nigro, nitidissimo, basi fronteque capitis squamis elongatis sejunctim vestitis; antennis piceis, clava brunnea, funiculi articulo primo duobus sequentibus conjunctim parum brevior; oculis rotundatis; prothorace conico, basi parum bisinuato, quam longitudine vix latiore, supra maculatim squamoso; scutello breviter ovato; elytris pone humeros latioribus, depressis, apicem versus gradatim angustioribus, apice ipso paulo emarginatis, singulis sulcis decem, squamis dense repletis, instructis, interstitiis nitentibus; corpore infra dense subsulphureo-squamoso; femoribus validis, infra dente parvo instructis; tarsis articulo primo secundo majore. Long. 8 lin.

*Hab.* Brazil.

#### OZOPHERUS.

(Cholinæ.)

*Cholo* affinis, sed *oculis* elongatis, transversis, infra acuminatis; *prothorace* lobis ocularibus distinctis; *coxis* anticis approximatis; *tibiis* apice biunguiculatis, intermediis et posticis margine posteriore apice oblique emarginatis et ciliatis.

The eyes are partly concealed in repose by the ocular lobes, which, however, although distinct, are not very prominent. The sole exponent of this genus is a remarkable insect on account of the spiniform tubercles (somewhat variable in size and number) with which the elytra are furnished, and the dense fringe of hairs clothing the inner edge of the anterior and posterior tibiæ.

**OZOPHERUS MURICATUS.** (Pl. XI. fig. 9.) *O. ovatus, niger, squamis silaceis plerumque dense tectus; rostro nigro, in medio carinato; antennis post medium rostri insertis; funiculo articulis gradatim brevioribus, primo longiore, ultimo ad clavam arcu applicato; prothorace ampliato, utrinque rotundato, supra granulis nitidis in series quatuor dispositis; scutello elongato-triangulari; elytris oblongo-cordatis, remote seriatim punctatis, tuberculis majoribus conicis instructis (singulis circa 7), aliis minoribus granulisque dispersis, apice rotundatis; corpore infra minus dense squamoso, abdominis segmento secundo sequente vix longiore; tibiis anticis et præsertim posticis intus longe pilosis.* Long. 10 lin.

*Hab.* Amazons (Para); Cayenne.

### NEEDUS.

(Cholinæ.)

*A Callinoto differt clava antennarum a funiculo distincta; prothorace lobis ocularibus nullis; et tibiis anticis haud unguiculatis.*

To these characters it may be added that the second abdominal segment is separated from the first by a strongly arched suture, and the intercoxal process is broader and more truncate than in *Callinotus*. The femora are sharply toothed beneath. The type is a small insect resembling *Callinotus Zetterstedtii*, Boh., and is one of the many discoveries of Mr. Bates.

**NEEDUS BIVITTATUS.** (Pl. XI. fig. 7.) *N. ellipticus, niger, opacus, rostro, antennis pedibusque rufo-testaceis, supra utrinque vittis duabus albo-squamosis a basi rostri ad apicem elytrorum continuatis ornatus; rostro modice tenuato; funiculo articulis tribus basalibus longioribus, subæqualibus, quarto quintoque multo brevioribus, duobus ultimis turbinatis; oculis magnis, rotundatis; prothorace subconico, lateribus perparum rotundato; tenuiter subtransversim granulato; scutello valde transverso; elytris prothorace manifeste latioribus, in medio paulo depressis, utrinque leviter rotundatis, apice ipso rotundato, supra tenuiter sulcatis, interstitiis confertim rugoso-punctatis; corpore infra dense subsulphureo-squamoso; tibiis intus sat fortiter bisinuatis.* Long. 4 lin.

*Hab.* Amazons.

**CALLINOTUS MICROSPILLOTUS.** *C. elongato-ellipticus, niger, squamis subaurantiacis plerumque dense tectus; rostro versus apicem sensim et fortiter incrassato; funiculo antennarum articulo basali quatuor sequentibus æquali, quinque ultimis transversis, in clavam gradatim continuatis, pubescentibus; prothorace transverso, interrupte subgranulato, plagis indeterminatis tribus longitudinalibus, e*

squamis minus condensatis, notato; scutello nigro, fere rotundato, elytris prothorace perparum latioribus, lateribus leviter rotundatis, apicibus subacuminatis, granulis minutis plurimis maculatim adspersis; corpore infra pedibusque minus dense silaceo-squamosis; femoribus infra dente parvo armatis. Long. 7 lin.

*Hab.* Brazil.

I refer this very distinct species to *Callinotus*, Schön., on account of its approximate anterior coxæ, and the club of the antennæ being closely adnate to the funicle. The spots on the upper surface caused by the black granules are small but very distinct. *Cholus carinatus*, Guér., I also refer to this genus.

**SOLENOPUS BILINEATUS.** *S. oblongus*, niger, fusco-squamosus, vittis duabus albo-squamosis utrinque ad apicem prothoracis usque ad apicem elytrorum continuatis; rostro fusco-piceo, quinquecarinato (♀ minus notato), sparse griseo-squamuloso; antennis piceis, funiculo articulis duobus basalibus æqualibus, singulisque tertio quartoque conjunctim æqualibus, ultimo ad clavam arcuato applicato; prothorace subtransverso, utrinque ampliato-rotundato, granulis plurimis plus minusve crescentiformibus sat sparse transversim notato; scutello subscutiformi; elytris prothorace paulo latioribus, postice gradatim angustis, apicibus rotundatis, supra fortiter seriatim punctatis, inter puncta transversim granulato-rugosis, posticis minus punctatis, lævibus; corpore infra pedibusque sparse grisescenti-squamosis. Long. 8 lin.

*Hab.* Cayenne; Mexico.

The metasternum and first two abdominal segments are largely excavated in this species, as they are in *S. morbillosus*, Drury, and *S. spinicollis*, Boh.; but this is probably a sexual character distinctive of the male. The names of this and the following species are adopted from Dejean's 'Catalogue.'

**SOLENOPUS TRANSVERSALIS.** (Pl. XI. fig. 4.) *S. oblongus*, ater, opacus, squamulis minutis concoloribus adspersus; rostro tricarinato, basi rude punctato; antennis ferrugineis, ut in præcedente descriptis; prothorace minusculo, transverso, utrinque ampliato-rotundato, granulis planiusculis dispersis munito, antice vage punctulato; scutello elevato, subscutiformi; elytris prothorace manifeste latioribus, subparallelis, apicem versus rotundatis, seriatim fortiter clathrato-punctatis, punctis postice gradatim minoribus, basi, fascia transversa pone medium, apiceque albo-squamosis; sternis, lateribus abdominis, pedibusque, tibiis exceptis, squamulis filiformibus sat dense vestitis; femoribus infra dente parvo acuto armatis; tibiis intermediis brevibus. Long. 7 lin.

*Hab.* Brazil.



## CRYPTASPIS.

(Cholinæ.)

*Caput* rotundatum; *rostrum* elongatum, arcuatum, cylindricum, apice depressum; *scrobes* præmedianæ, oculos attingentes. *Antennæ* graciles; *funiculus* articulo primo longiore, cæteris oblongis; *clava* elliptica, subadnata. *Oculi* rotundati. *Prothorax* ampliatus, lobis ocularibus prominulis. *Scutellum* nullum. *Elytra* subtrigonata, prothorace angustiora. *Pedes* elongati; *femora* vix incrassata, antica longiora, infra leviter dentata; *tibiæ* fere rectæ, compressæ, apice inermes, quatuor posteriores apicem versus extus ciliatæ; *tarsi* lati; *unguiculi* liberi, approximati. *Propectus* ampliatus, integrum. *Metasternum* breve. *Abdomen* segmento basali amplo, secundo multo brevior.

The shortness of the metasternum approximates this genus to *Sclerosomus*, which is the only other one of the subfamily having the same character. From that, however, it differs in many respects—notably in the tibiæ not being bimucronate, in the large and non-emarginate propectus, and in the absence of a scutellum. I have adopted M. Jekel's catalogue name, under which the species described below has long been known in collections.

CRYPTASPIS AMPLICOLLIS. (Pl. XI. fig. 10.) *C. obovata*, nigra, squamositate grisea supra tecta; capite vage squamoso; rostro basi leviter punctulato; antennis ferrugineis; funiculi articulo primo secundo duplo longiore, 2.-4. obconicis, 5.-7. oblongo-obovatis; clava articulo basali reliquis conjunctim æqualibus; prothorace transverso, subtiliter granulato; elytris prothorace plus sesquolongioribus, obsolete granulatis; corpore infra vage squamoso; pedibus squamis piliformibus parce vestitis. Long. 4 lin.

*Hab.* New Granada.

GUIOPERUS EQUES. *G. ovatus*, niger, umbrino-squamosus, elytris fasciis duabus griseis ornatis; rostro rude punctato; antennis nitide piceis, clava tomentosa; prothorace haud crebre granulato; scutello nigro; elytris utrinque subparallelis, sulcato-punctatis, interstitiis, præsertim basi, fortiter granulatis, fascia fere in medio, alteraque postice sitis; corpore infra pedibusque sordide umbrino-squamosis. Long. 8 lin.

*Hab.* Nicaragua (Chontales).

The metasternum presents a fold or crest behind each of the posterior coxæ in the species of this genus; but in this it is so raised as to form a stout spine or tooth. This is a very distinct

species, and is one of the many discoveries of Mr. E. Janson, jun. It may be placed after *G. Klugi*, but is differently coloured, has longer and more parallel elytra, and is more coarsely granulated.

**EUTHYRHINUS PICTUS.** (Pl. X. fig. 12.) *E. ovalis*, niger, omnino dense albido-squamosus, supra fuscescente notatus; rostro breviusculo, parum arcuato, nigro-piceo, leviter punctato, basi parce squamoso; antennis piceis; funiculo brevi, articulo secundo primo paulo longiore; clava late ovata; prothorace magis transverso, utrinque rotundato, fascia arcuata in medio plagaque basali pallide fusciscentibus et sat parce granulatis; scutello nigro; elytris oblongo-subcordatis, sulcato-punctatis, interstitiis convexis granulis nitide nigris, plerumque uniseriatim sitis, postice sensim minoribus et magis dispersis, pone medium fascia arcuata, antice dilutior, et singulis macula basali, fusciscentibus decoratis; femoribus dente parvo instructis. Long.  $3\frac{1}{2}$  lin.

*Hab.* Singapore.

**EUTHYRHINUS ICONICUS.** *E. obovatus*, fuscus, dense squamosus; capite fulvo-squamoso, antice nigro-punctato; rostro brunneo, parum arcuato, rude punctato, basi squamoso; antennis rufo-ferrugineis; funiculi articulis duobus basalibus æqualibus, longiusculis, tertio parum oblongo, cæteris modice transversis; clava late ovali; prothorace utrinque ampliato, fulvo-squamoso, disco saturatiore, plagis duabus basalibus exceptis, et subtiliter nigro-granulato; scutello minuto; elytris oblongo-subcordatis, sulcato-punctatis, interstitiis convexis, alternis magis elevatis, granulis nigris præcipue prope suturam, et postice evanescentibus, adpersis, fuscis, plaga magna subalbida dorsali, pone medium valde constricta, ornatis; corpore infra, pedibusque densissime albido-squamosis, his extus saturatioribus; femoribus dente minuto instructis. Long.  $4\frac{1}{2}$  lin.

*Hab.* Mysol.

I am unable to separate *E. squamiger*, Wh., from *E. medibundus* of collections, and probably also of Boheman in Schön.; but the species of Fabricius (the type is still extant in the British Museum) seems to be somewhat different. I have half a dozen other species from the Malay region besides the two here described, which are exceptionally well marked; one of them, from Sarawak, is very closely allied to *E. squamiger*. Boisduval's *E. monachus*, judging from the very short description, I am inclined to identify with a rather common species from Queensland.

**AONYCHUS LUCTUOSUS.** (Pl. XII. fig. 1.) *A. late ovatus*, atro-squamosus, supra concinne albo-maculatus, subtus pedibusque dense albido-squamosis; scutello albo; elytris seriatim punctatis, interstitiis latis, planatis. Long.  $2\frac{3}{4}$  lin.

*Hab.* West Australia.

The head is unfortunately wanting in my specimen, the only one I have seen; but the insect is unmistakably an *Aonychus*, and such an interesting addition to the genus that I am unwilling to let it remain unpublished. It is considerably broader than *A. Hopei*, the scales on the upper parts not so closely set and coarser; the pattern also is different. It is still further removed from *A. lineatus*.

*ECTATORRHINUS ADAMSII*. *E.* (♂) ovatus, niger, fulvo-squamosus; rostro dimidio corporis brevior, basi excepta, nigro nitido; antennis nigris, funiculo sat breviusculo; prothorace crebre rude scrobiculato, in medio carinula lineari nitida instructo; elytris confertim fortiter foveatis, singulis dorso tuberculis parvis saturate fulvis quatuor, apicem versus tuberculo uno, postice in declivitate tuberculo majore pallidiore notatis, macula ochracea utrinque basali ornatis, humeris fulvo callosis; corpore infra rude punctato; pedibus haud elongatis, ochraceo fulvoque annulatis. Long.  $6\frac{1}{2}$  lin.

*Hab.* Tsusima (Japan).

*ECTATORRHINUS FEMORATUS*. (Pl. X. fig. 10.) *E.* (♂) elliptico-ovatus, niger, squamulis minutis interrupte vestitus; rostro dimidio corporis paulo brevior, basi excepta, nigro nitido; antennis nigris, longiusculis, clava obovata; prothorace rude scrobiculato, dorso elevato, in medio fortiter carinato; elytris subcordatis, umbrino variegatis, striato-punctatis, interstitiis rude elevatis, tertio a sutura tuberculis tribus, quinto tuberculo uno, et pone humeros tuberculo valido conico instructis; pedibus elongatis; femoribus nigris, concinne flexuose albo annulatis; tibiis fusco albidoque annulatis; tarsis ochraceis. Long.  $5\frac{1}{2}$  lin.

*Hab.* Sarawak.

Lacordaire founded the genus *Ectatorrhinus* on what I believe to be a female; the two very marked species here described are of the opposite sex and agree generically with the male of *E. Wallacei*, the type. The first species, which I have named after Arthur Adams, Esq., its discoverer, is at once distinguished from the latter by the tubercles on the elytra, and is interesting from its northern habitat. The second species differs from both in having a strong conical tubercle on each side behind the shoulder. The contiguous anterior coxæ is the only really important character differentiating *Ectatorrhinus* from *Mecocorynus*; in my specimens I do not find the scape attaining the eye as stated by Lacordaire. Of the latter genus I have five undescribed species, with habitats ranging from New Guinea to Cambodia and China.

## INOZETES.

## (Cryptorhynchinæ.)

*Rostrum* breve, rectum, validum; *scrobes* præmedianæ, obliquæ, infra rostrum currentes, oculos haud attingentes. *Antennæ* breves; *funiculus* 6-articulatus, articulo primo elongato, secundo obconico, cæteris transversis, gradatim latioribus, in clavam continuatis. *Oculi* ovati, liberi. *Prothorax* transversus, utrinque rotundatus, apice vix productus, lobis ocularibus fere obsoletis. *Elytra* oblongo-cordata, prothorace paulo latiora. *Pedes* validi; *femora* incrassata, subtus dentata; *tibiæ* breves, subrectæ, intus bisinuatae; *tarsi* articulis tribus basalibus conjunctim triangularibus, quarto mediocri. *Propectus* brevissimum, inter coxas anticas excavatum; *mesosternum* antice verticale.

Allied to *Psepholax* and *Strongylopterus*, but differing from both in the six-jointed funicle and very short propectus; this is due to its deep emargination, which only leaves a narrow portion in front of the anterior coxæ.

INOZETES PETECHIALIS. (Pl. X. fig. 11.) *I. ovalis*, convexus, fulvo-testaceus, supra variegatim griseo ochraceoque squamosus; capite antice convexo; rostro latitudine plus duplo longiore, versus apicem squamis sensim minoribus; antennis testaceis, clava infuscata; prothorace subtransverso, basi haud angustiore, sat dense squamoso; scutello rotundato; elytris striato-punctatis, interstitiis transversim granulatis, squamis paulo adpersis, maculis ochraceo-testaceis, e squamis minus condensatis, irregulariter irroratis; corpore infra sat sparse, pedibus magis dense squamosis; femoribus posticis validioribus, dente majore instructis. Long. 4 lin.

*Hab.* Batchian.

## OSSETERIS.

## (Cryptorhynchinæ.)

*Rostrum* breve, validum, rectum, paulo depressum; *scrobes* medianæ, rectæ, dimidium inferius oculorum attingentes. *Antennæ* breves; *funiculus* 7-articulatus, articulis 1. 2. breviter obconicis, cæteris valde transversis, in clavam continuatis. *Oculi* subrotundati, infra paulo acuminati, grosse granulati. *Prothorax* vix transversus, utrinque rotundatus, antice tubulatus, apice productus, lobis ocularibus latis. *Elytra* oblonga, subcordata,

prothorace parum latiora. *Pedes* subvalidi ; *femora* incrassata, subtus dentata ; *tibiæ* modice elongatæ, rectæ, apice unguiculatæ ; *tarsi* articulo basali longiusculo, ultimo elongato. *Propectus* elongatum, profunde canaliculatum ; *mesosternum* antice truncatum. *Abdomen* segmento secundo ampliato.

In this genus the pectoral canal is limited behind by the truncate anterior portion of the mesosternum, but the sides behind the anterior coxæ are open. This character distinguishes it, *inter alia*, from *Strongylopterus* and *Glechinus*. Its strongest affinity is with the Chilian *Empleurus*, Lac., but differing in the rostrum and scrobes.

**OSSETERIS SCUTELLARIS.** *O.* oblongo-ovalis, fuscus, squamulis griseis erectis parce vestitus, scutello solo dense appressis ; rostro capite vix longiore, sejunctim squamoso ; antennis piceis, clava breviter ovata ; prothorace longitudine parum latiore, basi haud angustiore, leviter bisinuato, squamis nigris subsetiformibus erectis adperso ; scutello oblongo ; elytris striato-punctatis, interstitiis convexis, præsertim postice, pone medium squamulis fasciatim magis condensatis ; corpore infra pedibusque piceis, sat dense squamosis ; tibiis intermediis basin versus margine exteriori angulato-dentatis. Long  $4\frac{1}{4}$  lin. *Hab.* New Guinea (Dorey).

#### THEREBUS.

##### (Cryptorhynchinæ.)

*Empleuro* affinis, sed *rostro* capite triplo longiore, tenuiore, recto, et *scrobibus* medianis.

The rostrum is also much longer and more slender and cylindrical than in *Osseteris* ; the eye is ovate and finely faceted, while in *Osseteris* and *Empleurus* it is coarsely faceted ; in the latter the scrobes commence nearly at the base of the mandibles. The type of the genus is a yellowish-brown insect (under the lens the scales are seen to have a golden tinge) and bears a certain resemblance to *Cepurus torridus*.

**THEREBUS CEPUROIDES.** *T.* oblongus, piceus, sat dense subaureo-squamosus ; rostro apicem versus depresso ; mandibulis porrectis, antennis ferrugineis ; funiculi articulis duobus basalibus breviusculis, primo paulo longiore, cæteris valde transversis ; prothorace transverso, antice angusto, tubulato, utrinque rotundato ; scutello scutiformi, squamulis minutis pallidioribus dense tecto ; elytris prothorace manifeste latioribus, ad latera vix rotundatis, sulcato-punctatis ; corpore



infra pedibusque squamulis angustioribus flavescentibus vestitis.

Long.  $4\frac{1}{2}$  lin.

Hab. Western Australia.

The following is a Key to the genera of Lacordaire's two groups "Psépholacides" and "Strongyloptérides."

Scrobes oblique, attaining the lower margin of the eye.

Propectus of normal length ..... *Psepholax*, Wh.

Propectus very short ..... *Inozetes*, n. g.

Scrobes straight, attaining the anterior margin of the lower half of the eye.

Ocular lobes feeble.

Mesosternum vertically truncate anteriorly, bounding the pectoral canal behind.

Scrobes terminal..... *Empleurus*, Lac.

Scrobes median.

Eyes ovate, transverse, finely faceted.

*Therebus*, n. g.

Eyes nearly round, coarsely faceted.

*Osseteris*, n. g.

Mesosternum declivous, not forming part of the canal.

Eyes partly covered by the prothorax.

*Strongylopterus*, Schön.

Eyes free..... *Glechinus*, Pasc.

Ocular lobes produced ..... *Aularhinus*, Schön.

## METRANIA.

### (Cryptorhynchinae.)

*Rostrum* elongatum, tenuissimum, arcuatum, apicem versus depressum; *scrobes* laterales, basi propius quam in medio incipientes. *Antennæ* mediocres; *scapus* oculum haud attingens; *funiculus* 7-articulatus, articulis elongatis, duobus ultimis ovalibus; *clava* ovata, distincta. *Oculi* magni, subrotundati, antice approximati, grosse granulati. *Prothorax* transversus, subconicus, lobis ocularibus nullis. *Scutellum* triangulare. *Elytra* subcordata, prothorace multo latiora. *Pedes* modice elongati; *femora* paulo incrassata, infra dente parvo instructa; *tibiæ* subrectæ, compressæ, apice unguiculo brevi armatæ; *tarsi* normales; *unguiculi* divergentes. *Rima* pectoralis ad segmen-

tum primum abdominis protensa, apice aperta. *Metasternum* modice elongatum. *Abdomen* segmentis intermediis æqualibus.

There is only one other genus in the subfamily in which the pectoral canal passes beyond the metasternum—*Panolcus*; and in that it extends to the extremity of the abdomen. The only species of this genus is an insect of a dark chocolate-colour, the scales, from their position, having a cloth-like texture, with the sides of the prothorax and elytra ochreous grey; on the former the grey begins at the apex, leaving a well-limited dark triangular patch on the centre and base. The genus may be placed after *Mecistocerus*.

**METRANIA PALLIATA.** (Pl. XIII. fig. 11.) *M. breviter elliptica*, fusca, rude squamosa; rostro nitide castaneo, basi grosse, reliquo subtilissime vage punctulato; antennis subferrugineis, funiculo articulis 2. 3. paulo longioribus; prothorace utrinque, humeris lateribusque elytrorum ochraceo-squamosis, dorso chocolatio-brunneo; corpore infra nitide fusco, punctis dispersis singulis squama grisea repletis; pedibus sat dense griseo-squamosis. Long. 4 lin.

*Hab.* Cayenne.

## METYRUS.

### (Cryptorhynchinæ.)

*Rostrum* validum, subarcuatum; *scrobes* medianæ, laterales. *Funiculus* breviusculus, articulis duobus basalibus longioribus, ultimo latiore; *clava* elongata, subadnata. *Oculi* tenuiter granulati. *Prothorax* transversus, antice angustus, apice productus, lobis ocularibus prominulis. *Elytra* prothorace vix latiora, humeris callosa. *Femora tibiæ*que compressæ, illa longiuscula, valida, infra dente instructa; hæ breves, basi extus angulatæ; *tarsi* normales; *unguiculi* divergentes. *Mesosternum* valde elevatum, fornicatum.

It is very probable that *Cryptorhynchus albicollis*, Germ., belongs to this genus. Unfortunately *Cryptorhynchus* has become one of those thoroughly vague generic names that carries with it no idea of definite characters; but the colouring, which is remarkable, is very similar to that of the species described below. This genus belongs to the *Chætectetorus* form, and is allied to *Metacymia*, which has a small claw-joint, a longer metasternum, and a broad intercoxal process. *Chimades*, another ally, has, *inter alia*, straight, terete tibiæ.

**METYRUS COLLARIS.** (Pl. XII. fig. 4.) *M. obovatus*, fuscus, squa-

mosus; capite ochraceo, nigro vario; rostro prothorace brevior, vage punctato; antennis ferrugineis, subsetulosis; clava nigra; prothorace plerumque dense albo-squamoso, basi fusco-bimaculato, dorso in medio linea elevata longitudinali, tuberculisque sex (2 apicalibus, 4 medianis, transversis) notatis; scutello subquadrato; elytris oblongis, ruguloso-punctatis, squamulis fuscis inconspicuis vestitis, macula humerali plagaque apicali albidis, tuberculis fasciculatis nonnullis adspersis, præcipue singulatim duobus rotundatis basalibus, interiore majore, alteroque apicali; corpore infra pedibusque dense albido fuscoque squamosis. Long.  $4\frac{1}{4}$  lin.

*Hab.* West Australia.

**POROPTERUS PORRIGINEUS.** (Pl. XII. fig. 2.) *P. ovatus*, supra depressus, ater, squamulis concoloribus suberectis sat sparse tectus; rostro valido, prothorace brevior; antennis rufo-piceis; clava nigra, tomentosa; scapo elongato; funiculi articulo secundo tribus sequentibus conjunctim longior, primo brevior, ultimo ampliato; prothorace latitudine paulo brevior, antice multo angustior, utrinque rotundato, basi paulo incurvato, angulis posticis rotundato, apice modice producto, in medio longitudinaliter carinulato, dorso plagis duabus nudis notato; scutello invisio; elytris basi prothorace parum latioribus, deinde fortiter rotundatis, postice gradatim declivibus, subcostatis, costis duabus dorsalibus singulatim subbifasciatis, sat remote leviter foveatis; pedibus rude squamosis; processu intercoxali dilatato; abdomine segmentis duobus basalibus ampliatis, sutura prima in medio minus distincta. Long. 4 lin.

*Hab.* Victoria.

The contour of this species, almost wedge-shaped, except for the slightly rounded outline, from the posterior third of the elytra, is its most striking character.

**POROPTERUS MUSCULUS.** *P. subovatus*, niger, squamositate brunnea tectus, squamis erectis plerumque fuscis adspersus; rostro valido, sat breviusculo; antennis subpiceis, funiculi articulis duobus basalibus conjunctim scapo parum longioribus, primo longior et crassior; prothorace latitudine brevior, antice haud producto, pone apicem utrinque fortiter rotundato, basi subtruncato, supra fasciculis sex instructo, 2 apicalibus, 4 transversim antemedianis; scutello orbiculari; elytris modice convexis, lateribus leviter rotundatis, postice perparum latioribus, humeris fortiter productis, apicem versus subito angustioribus, apice ipso late rotundatis, dorso fasciculis plurimis adspersis; pedibus rude squamosis; abdomine segmento secundo quam 3. 4. conjunctim fere duplo longior, sutura prima oblitterata. Long. 3 lin.

*Hab.* Tasmania.

The smallest species of the genus, and in habit like *Agenopus*

*agricola*; in the large size of the two basal segments of the abdomen it agrees with the preceding; but the first suture, dividing the two segments, is only slightly apparent on the sides.

**POROPTERUS BISIGNATUS.** *P. ovatus*, supra subdepressus, fuscus, umbrino, infra pedibusque griseo-squamosus; rostro valido, sat breviusculo; antennis piceis; funiculi articulo secundo primo fere duplo longiore, cæteris rotundatis, ultimo crassiore; prothorace subobcordato, antice supra valde producto, apice subbilobo, ante medium utrinque conico, postice parallelo, sat confertim rude squamoso; scutello inconspicuo; elytris utrinque rotundatis, apicem versus gradatim angustioribus, postice rotundato-declivibus, grosse foveatis, interspatiis confertim callosis, humeris antrorsum elevato-productis, bilobis, apice late rotundatis; mesosterno lato; abdomine segmento secundo quam tertio quartoque conjunctim brevior, sutura prima distincta. Long. 4 lin.

*Hab.* Moreton Bay.

The name is derived from two palish spots on the declivity of the elytra; but in rubbed specimens these are not very evident. The chief diagnostics of this species are the form of the prothorax and the elevated bilobed shoulders.

**POROPTERUS FOVEIPENNIS.** *P. oblongo-ovatus*, niger, parce griseo-squamosus; rostro valido, rude, basi seriatim, punctato; antennis piceis; funiculi articulo secundo primo vix sesquolongiore; prothorace subobcordato, supra planato, antice valde producto, apice anguste rotundato, basi prope scutellum fortiter biimpresso, raro irregulariter punctato, tuberculis quatuor parvis in medio transversim sitis; scutello, ut videtur, nullo; elytris subovalibus, modice convexis, prothorace paulo latioribus, sat vage subseriatim foveatis, interspatiis irregulariter callosis, postice rotundato-declivibus, tuberculis majusculis notatis, humeris parum productis; corpore infra pedibusque squamis elongatis vestitis; tibiis, præsertim posticis, brevibus. Long.  $3\frac{3}{4}$ –4 lin.

*Hab.* New South Wales (Illawarra).

In outline like the preceding, but, *inter alia*, with the apex of the prothorax entire, the shoulders not lobed, short tibiæ, &c. *Poropterus succosus*, Boh., seems to me to be the same as *Cryptorhynchus succisus*, Er. It is difficult to understand how so admirable an entomologist as Erichson\* could have satisfied himself with referring so many species to *Cryptorhynchus*, a name even now of no definite meaning, without some notice of the structural peculiarities that go to the differentiation of genera.

\* Wiegmann, Arch. 1842, i. pp. 202 *et seqq.*

**PETOSIRIS CORDIPENNIS.** (Pl. XII. fig. 3.) *P. brevis*, latus, supra modice convexus, fuscus, squamis elongatis erectis interjectis, sordide silaceis sat dense vestitus; capite inter oculos depresso, in medio foveato; rostro prothorace paulo brevior; antennis ferrugineis; funiculi articulo secundo quam primo vix sesquolongiore; prothorace transverso, lateribus pone apicem parallelo; elytris prothorace multo latioribus, conjunctim cordiformibus, sparse seriatim punctatis, singulis tuberculis fasciculatis circa 8 notatis—3 basalibus, quorum uno humerali magis producto, 3 antemedianis, 2 posticis; femoribus in medio modice incrassatis. Long.  $3\frac{3}{4}$  lin.

*Hab.* Queensland.

Very distinct from *P. subereus*, and with thicker femora, but in other respects generically identical.

**HEXYMUS MONACHUS.** *H. ovatus*, fuscus, indumento griseo tectus, squamisque subsilaceis elongatis omnino adpersus; capite inter oculos transversim excavato; rostro vix tenuato; antennis ferrugineis, funiculi articulo primo secundo sesquolongiore, tertio breviter obconico, tribus ultimis subturbinatis; clava breviter ovata; prothorace transverso, elevato, dorso quadricalloso, apice crista cariniformi munito, lateribus rotundato, lobis ocularibus obsoletis; scutello punctiformi; elytris valde convexis, seriatim foveatis, callis plurimis, plerumque indeterminatis, notatis. Long. 4 lin.

*Hab.* Queensland (Rockhampton).

A very distinct species from its only congener *H. tuberosus*.

**COLOBODES NODULOSUS.** *C. crassus*, niger, squamulis umbrinis, in medio fuligineis, dense vestitus; rostro subvalido, prothorace paulo brevior, apice nudo, nitido, tenuiter punctulato; antennis rufo-testaceis, funiculi articulo secundo primo sesquolongiore, cæteris turbinatis, clava ampla, obovata, fusciscente; prothorace parvo, conico, antice elevato, apice producto, tuberculis fasciculatis sex, 2 apicalibus magnis, 4 parvis in medio transversim sitis; scutello suborbiculari, squamoso; elytris ampliatis, pone basin valde convexis, lateribus parallelis, fortiter sulcatis, interstitiis squamoso-tuberculatis, tertio basi magis elevato; corpore infra pedibusque valde squamosis. Long. 4 lin.

*Hab.* Batchian.

**COLOBODES FASCICULATUS.** (Pl. X. fig. 7.) *C. minus* crassus, nigro-fusco-squamosus, elytris striga abbreviata obliqua basali ochracea ornatis; rostro subvalido, prothorace paulo brevior, apice nudo, nitido, sat fortiter punctato; antennis ferrugineis; funiculi articulis duobus basalibus longitudine æqualibus, tertio obconico, cæteris subturbinatis, gradatim crassioribus; clava breviter obovata; prothorace latitudine vix longiore, utrinque rotundato, antice vix elevato, apice producto,



tuberculis fasciculatis æqualibus sex, 2 apicalibus, 4 in medio transversim sitis; scutello angusto, nudo; elytris minus ampliatis, convexis, lateribus leviter rotundatis, striato-punctatis, interstitiis modice convexis, sparse setulosis, 3. 5. 7., præsertim tertio, tuberculato-fasciculatis; corpore infra, segmentis tribus ultimis abdominis exceptis, femoribusque basi ochraceo-squamosis; tarsis subochraceis. Long. 5 lin.

*Hab.* Amboyna.

Schönherr's two species of *Colobodes* are unknown to me; but so far as *his* descriptions go, I have little hesitation in referring the first of the above to this genus. The second differs in the relative length of the first two funicular joints and in the shortness of the club of the antennæ; but the two species ought not, I think, to be generically separated on these characters.

#### LATYCHUS.

#### (Zygopinæ.)

*Rostrum* breviusculum, validum, arcuatum; *scrobes* præmedianæ, obliquæ, ab oculis longe desinentes. *Scapus* brevis; *funiculus* 7-articulatus, articulis tribus basalibus longioribus, cæteris sensim transversis, ultimo clavæ adnato. *Oculi* mediocres, rotundati, antice haud approximati, a prothorace distantes. *Prothorax* conicus, lobis ocularibus nullis. *Scutellum* subrotundatum. *Elytra* trigonata, pygidium obtegentia, humeris angulato-productis. *Pedes* mediocres; *femora* valida, infra obsolete dentata; *tibiæ* apice unco valido armatæ; *tarsi* articulo tertio profunde bilobo. *Coxæ* anticæ distantes. *Mesosternum* transversim leviter excavatum. *Metasternum* breve, tumidum. *Abdomen* segmentis duobus basalibus ampliatis.

A genus allied to *Pinarus* and *Piazurus* on account of the mesosternum entering into the formation of its pectoral canal, but with a stout shortish rostrum, rather small eyes, not contiguous to the prothorax or to one another, and the femora but slightly thickened and not toothed beneath.

**LATYCHUS RIVULOSUS.** (Pl. XIII. fig. 9.) *L. niger*, sat dense griseo fuscoque squamosus; capite inter oculos excavato; rostro ferrugineo, in medio leviter carinulato, subreticulato-punctato; antennis ferrugineis; funiculi articulo secundo longiore; prothorace fusco-trivittato, vitta intermedia latiore; elytris supra irregularibus, lineatim sulcatis, interstitiis convexis, tertio tuberculis angustis duobus

(uno basali, uno mediano), interstitio quinto unico postico, notatis, apicibus divergentibus; corpore infra pedibusque silaceo-squamosis; metasterno valide binodoso. Long. 7 lin.

*Hab.* Brazil.

#### METHYORRHINA.

(Baridinæ.)

*Rostrum* modice elongatum, haud compressum, ad basin quasi abscissum; *scrobes* submedianæ, infra rostrum cito currentes. *Antennæ* breviusculæ; *scapus* oculum attingens; *funiculus* 7-articulatus, articulo primo ampliato, cæteris gradatim incrassatis; clava adnata. *Oculi* ovati, mediocres, inferi, tenuiter granulati. *Prothorax* convexus, subsemicircularis, basi bisinuatus, lobis ocularibus late productis. *Elytra* prothorace parum latiora, breviuscula, depressa. *Pedes* breves; *femora* crassa, mutica; *tibiæ* breves, rectæ, apice unguiculatæ; *coxæ* anticæ sat, intermediae valde remotæ. *Pectus* latum, in medio transverse sulcatum. *Abdomen* segmentis 3. 4. brevibus; *suturæ* rectæ.

Allied to *Phacelobarus*, a curious genus from Madagascar, but with ocular lobes, and the rostrum not compressed or gibbous at the base and sharply constricted at its junction with the head.

METHYORRHINA HISPIDA. *M.* breviuscula, fusca, setulis erectis albis silaceisque, nigris interjectis, parce vestita; rostro prothorace evidenter brevior, sat crebre oblongo-punctato, basi rude squamoso; articulo primo funiculi secundo plus duplo longiore; prothorace basi latiore, crebre punctato, lobo scutellari lato; scutello transverso, postice rotundato; elytris basi latioribus, lateribus gradatim parum angustioribus, apice late rotundatis; corpore infra pedibusque squamis piliformibus subadpressis vestitis. Long.  $2\frac{1}{4}$  lin.

*Hab.* Brazil.

#### PITHECOMUS.

(Baridinæ.)

*Caput* exsertum, supra rostrum continuatum; *rostrum* subtenuatum, modice elongatum, paulo arcuatum, a basi gradatim angustius; *scrobes* submedianæ, infra rostrum cito currentes. *Antennæ* breviusculæ; *scapus* oculum attingens; *funiculus* 7-articulatus, articulo primo longiore, cæteris brevissimis, sensim incrassatis; *clava* adnata. *Oculi* mediocres, ovati, transversi, inferi, tenuiter granulati. *Prothorax* transversus, lateribus parallelis, apice angustior, lobis ocularibus nullis. *Elytra* breviora,

prothorace parum latiora, subquadrata. *Pedes* breves; *femora* compressa, antica infra dentata; *tibiæ* brevissimæ, flexuosæ, apice unguiculatæ; *tarsi* articulis tribus basalibus conjunctim breviter triangularibus, quarto elongato; *unguiculi* simplices; *coxæ* anticæ et intermediæ distantes. *Pectus* latum, parum excavatum. *Abdomen* segmentis 3. 4. brevibus.

This genus is allied to the last, but differs from it, as well as from *Phacelobarus*, by the form of the rostrum, which proceeds gradually from the head, narrowing in profile to the apex. There is a cylindrical tooth or spine on the inner side of each anterior coxa, but whether attached to them or to the mesosternum is not quite apparent.

*PITHECOMUS URSULUS*. (Pl. XIII. fig. 5.) *P. brevisculus*, paulo depressus, squamulis piliformibus fulvidis, plerumque erectis, omnino dense tectus; rostro capite duplo longiore, ad medium, cum capite, dense squamoso, apicem versus nigro; antennis piceis, parce pilosis; articulo primo funiculi vix incrassato; prothorace latitudine multo brevior, lobo scutellari dilatato; elytris latitudine paulo longioribus, apice obtuse rotundatis; femoribus intermediis dente parvo instructis, posticis muticis; tarsis castaneis, minus squamosis, articulo ultimo nudo. Long.  $2\frac{1}{2}$  lin.

*Hab.* Bogota.

#### BEBELATUS.

(Baridinæ.)

*Rostrum* validum, arcuatum; *scrobæ* subterminales. *Funiculus* 7-articulatus, articulis duobus basalibus longiusculis, tribus ultimis transversis; *clava* libera, distincte articulata. *Oculi* grosse granulati. *Prothorax* inæqualis, rotundatus, lobis ocularibus prominulis. *Scutellum* triangulare. *Elytra* globosa, prothorace valde latiora. *Pedes* brevisculi; *femora* modice incrassata; *tibiæ* compressæ, basi arcuatæ, apice unco obliquo armatæ; *tarsi* normales, *unguiculi* divergentes. *Coxæ* anticæ basi contiguæ, faciebus interioribus pro receptione rostri oblique planatis. *Pectus* brevisculum, canaliculatum, utrinque dente triangulari armatum. *Mesosternum* integrum, declive. *Metasternum* brevissimum. *Abdomen* segmento secundo duobus sequentibus conjunctim brevior.

The sole exponent of this genus resembles a small spider, and is quite different from any other *Baris* known to me. It may be placed with the two preceding genera and with *Phacelobarus* and

*Scambus*, all very distinct in habit. After its shape, the most striking peculiarity consists in the way in which the anterior coxæ are sloped away for the reception of the rostrum.

**BEBELATUS ARANEA.** (Pl. XIII. fig. 7.) *B. brevis*, tumidus, niger, squamis griseo-fuscis tectus, aliisque elongatis adpersus; rostro squamoso, prothorace multo brevior; antennis testaceis; prothorace parvo, dorso tuberculis quatuor majoribus, lateribus quinque munitis, lobo basali truncato; elytris parum latioribus quam longioribus, indistincte seriatim punctatis, singulis novem tuberculis in series tres dispositis; pedibus valde squamosis; tarsis articulo ultimo unguiculisque testaceis. Long. 2 lin.

*Hab.* Amazons.

### EURYPAGES.

(Baridinæ.)

*Rostrum* elongatum, cylindricum, parum arcuatum; *scrobes* medianæ. *Antennæ* tenues, *scapo* oculum haud attingente; *funiculo* articulis duobus basalibus æqualibus, haud elongatis, cæteris gradatim brevioribus. *Oculi* ovales, tenuissime granulati. *Prothorax* transversus, convexus, apice tubulatus, basi bisinuatus, utrinque fortiter rotundatus. *Pedes* longiusculi, antice in mare multo longiores; *femora* in medio crassiora, infra fortiter dentata; *tibiæ* anticæ rectæ, cæteræ flexuosæ, apice mucronatæ, posticæ corbellis cavernosis; *tarsi* antici (♂) valde dilatati, fimbriati, cæteri, anticique in fœmina, art. duobus basalibus triangularibus, tertio fortiter bilobo; *unguiculi* connati. *Coxæ* anticæ haud approximatae. *Prosternum* haud canaliculatum. *Metasternum* modice elongatum. *Processus* intercoxalis latissimus.

Compared with *Centrinus* in its Schönherrian sense, *Eurypages* differs principally in the absence of the pectoral canal, and in the remoteness of the anterior coxæ. The length of the fore legs in the male and their dilated tarsi may be of little more than specific value. The species described below is a rather isolated form: it has the three intermediate segments of the abdomen curved at the sides; the scales on the elytra are arranged on each side of the striæ like the barbs of a feather.

**EURYPAGES PENNATUS.** (Pl. XIII. fig. 6.) *E. rhombicus*, niger, squamis piliformibus griseis munitus; capite punctis confertis unguamigeris impresso; rostro basi rude punctato; prothorace supra

oblique undulato-corrugato, griseo-plagiato, in medio antice carinulato; scutello cordato-triangulari, apice acuto; elytris profunde striatis, interstitiis valde convexis, basin versus latoribus, squamis oblique positis, plurimis condensatis fascias duas, irregulariter determinatas, formantibus; corpore infra sparse ochraceo-squamoso. Long. 7-8 lin.

*Hab.* Brazil (Morro Velho).

**PHÆNOMERUS NOTATUS.** (Pl. XIII. fig. 2.) *P. elongatus*, nigrofuscus, setulis albis sparsis maculatim condensatis obsitus; rostro antennisque ferrugineis, illo longiusculo, a basi gradatim angustiore, antice linea leviter elevata instructo, his in quartam partem basalem rostri insertis; funiculo quam clava sesquolongiore, clava ipsa oblongo-ovata; prothorace crebre punctato, punctis inter lineas obliquas dispositis, in medio carinula lævi notato; elytris striato-punctatis, interstitiis lineatim elevatis; pedibus ferrugineis; femoribus, posticis basi exceptis, fuscis. Long.  $1\frac{3}{4}$  lin.

*Hab.* New Guinea.

Allied to *P. Sundevalli*, Boh., but with a longer and more slender rostrum, the antennæ inserted in the basal quarter of the rostrum, the funicle longer, and the prothorax more coarsely punctured, &c. The spots are rather feebly marked, small and round on the prothorax, larger and more irregular on the elytra, in both formed by white transversely disposed setæ.

**PHÆNOMERUS EXILIS.** *P. elongatus*, nigrescens, setulis cinereis subfasciatim condensatis obsitus; rostro, antennisque pedibusque ferrugineis, illo capite sesquolongiore, dimidio basali antice lineis tribus elevatis notato; funiculo brevi; oculis magnis; prothorace crebre punctato, in medio carinula lævi notato; elytris striato-punctatis, interstitiis convexis, subtilissime corrugatis; corpore infra sparse niveo-setuloso. Long.  $1\frac{1}{2}$  lin.

*Hab.* Queensland (Gayndah).

A *Phænomerus* has lately been described by Dr. Gerstaecker, from Zanzibar (I have long had it in my collection from Natal). Previously a single species only was known (from Ceylon, and perhaps India); but Mr. Wallace's collection contained six others besides the one described above. The species before us, whose discovery we owe to Mr. Masters, in his recent expedition after that strange ganoid fish, the *Ceratodus Forsteri*, is a narrower form than *P. Sundevalli*, the prothorax less coarsely punctured, the interstices between the elytral striæ much less convex, the setæ more scattered, but forming a slightly marked band on the middle of the elytra.



## EXPLANATION OF THE PLATES.

## PLATE X.

- Fig. 1. *Semelima triangulum*.  
 2. *Berethia sannio*.  
 3. — *medinotata*; 3 *a*, hind leg.  
 4. *Saginesis latipennis*; 4 *a*, lateral view of the head.  
 5. *Acicnemis meriones*; 5 *a*, hind leg.  
 6. *Ottistira bispinosa*; 6 *a*, lateral view of the head and scape.  
 7. *Colobodes fasciculatus*.  
 8. *Onychopoma parda*.  
 9. *Cyrtozemias dispar*; 9 *a*, hind tibia and tarsus.  
 10. *Ectatorhinus femoratus*; 10 *a*, lateral view of the head (♂).  
 11. *Inozetes petechialis*; 11 *a*, lateral view of the head and scape.  
 12. *Euthyrhinus pictus*.  
 13. Front view of the head of *Ottistira ocularis*.  
 14. Lateral view of the head and part of prothorax of *O. gibbosa*.  
 15. Lateral view of the head of *Osseteris scutellaris*.  
 16. Lateral view of the head of *Ectatorhinus wallacei*, Lac. (♀).  
 17. Antenna of *Acicnemis frenata*.

## PLATE XI.

- Fig. 1. *Cholus notabilis*.  
 2. — *prætorius*.  
 3. — *Buckleyi*.  
 4. *Solenopus transversalis*.  
 5. *Anænomus rubiginæus*; 5 *a*, lateral view of the head and scape.  
 6. *Erethistes licheneus*; 6 *a*, lateral view of the head and scape.  
 7. *Nædus bivittatus*; 7 *a*, lateral view of the head and scape.  
 8. *Astyage lineigera*; 8 *a*, lateral view of the head and antenna.  
 9. *Ozopherus muricatus*; 9 *a*, hind tibia and tarsus; 9 *b*, lateral view of the head and scape.  
 10. *Cryptaspis amplicollis*.

## PLATE XII.

- Fig. 1. *Aonychus luctuosus*.  
 2. *Poropterus porrigineus*.  
 3. *Petosiris cordipennis*.  
 4. *Metyrus collaris*.  
 5. *Nemestra incerta*.  
 6. *Cycotida lineata*; 6 *a*, lateral view of the head.  
 7. *Cechides amænus*; 7 *a*, lateral view of the head.  
 8. *Timareta figurata*; 8 *a*, part of hind tarsus and first tarsal joint; 8 *b*, lateral view of the head.  
 9. *Nedyleda semiusta*; 9 *a*, lateral view of the head.  
 10. *Belus parallelus*.

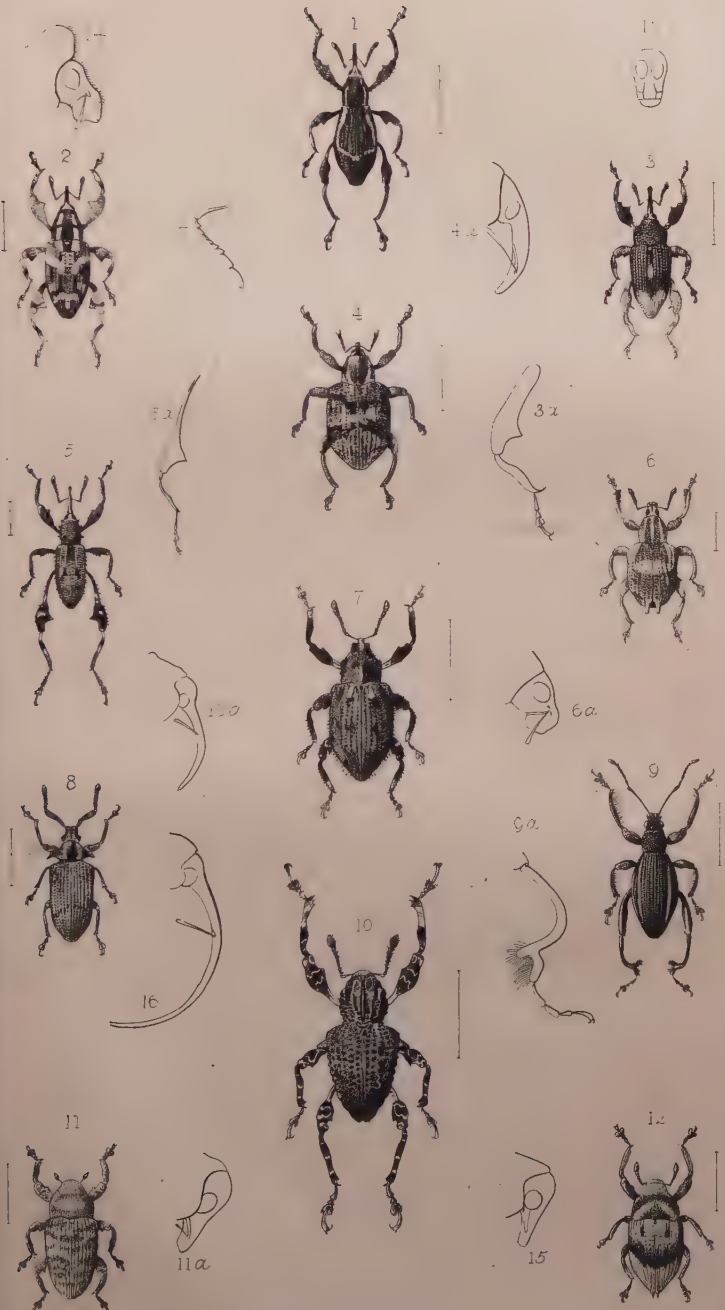
11. *Dialeptopus plantaris*.
12. *Euomus retusus*. (Inadvertently referred to Pl. XII. in the text.)
13. Lateral view of the head of *Therebus cepuroides*.
14. Lateral view of the head of *Ophryota squamibunda*.
15. Front view of the head and scape of *Atmesia glaucina*.
16. Lateral view of the head of *Zeopus storeoides*.
17. Lateral view of the head and scape of *Hexymus monachus*.
18. Lateral view of the head of *Dialeptopus granulatus*.

## PLATE XIII.

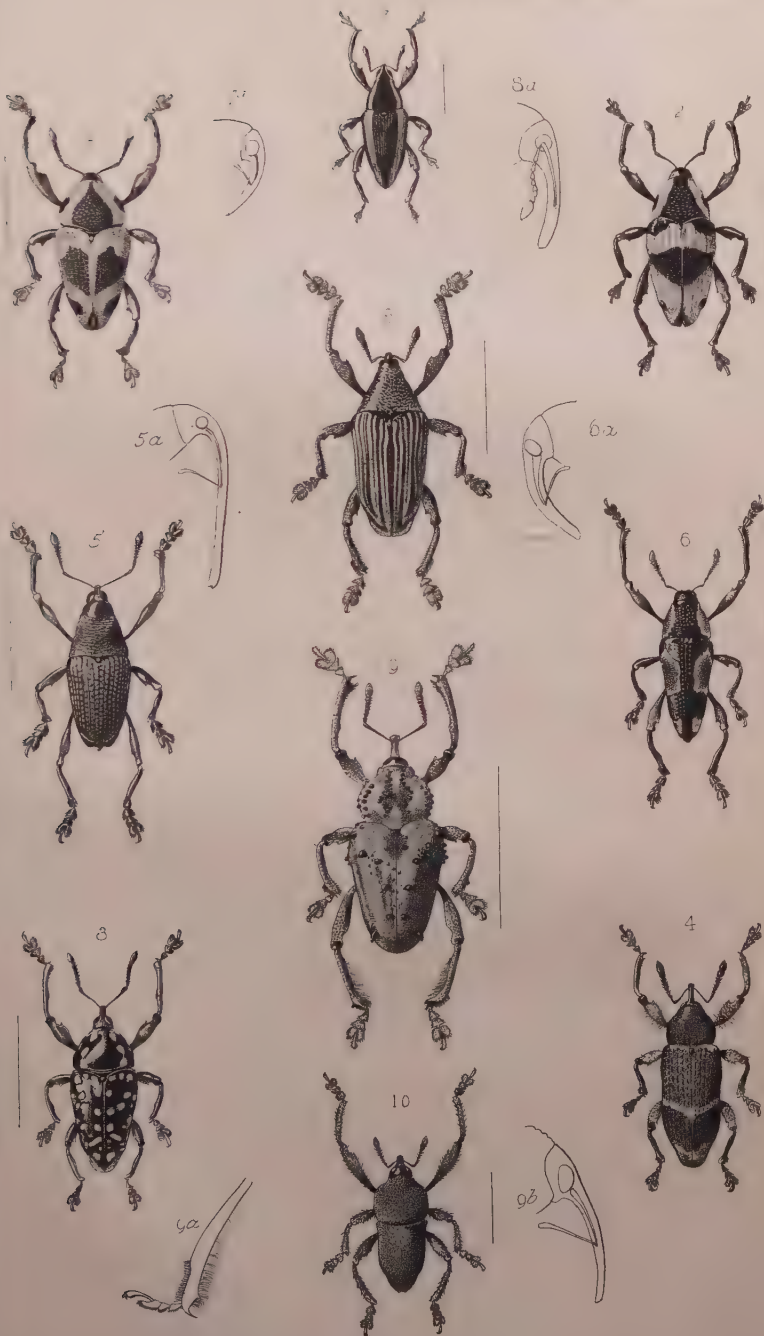
- Fig. 1. *Geobyrsa nodifera*; 1 a, lateral view of the head; 1 b, antenna.
2. *Phenomerus notatus*; 2 a, hind leg.
  3. *Peliobia geniculata*; 3 a, lateral view of the head.
  4. *Polydus dumosus*; 4 a, lateral view of the head.
  5. *Pithecomus ursulus*; 5 a, lateral view of the head.
  6. *Eurypages pennatus*.
  7. *Bebelatus aranea*; 7 a, lateral view of the head.
  8. *Ixodicus oclusus*; 8 a, lateral view of the head; 8 b, fore tibia and tarsus.
  9. *Latychus rivulosus*; 9 a, front view of head.
  10. *Dystirus strumosus*; 10 a, lateral view of head.
  11. *Metrania palliata*; 11 a, lateral view of the head.
  12. Lateral view of head of *Methyorrhina hispida*.
  13. Lateral view of the head of *Ixodicus sordidus*.

## ERRATUM.

Page 456, line 8 from bottom, for PELIEBIA read PELIOBIA.





















Observations on the Cutaneous Exudation of the *Triton cristatus*, or Great Water-Newt. By Miss ELEANOR A. ORMEROD.

[Read June 6, 1872.]

MY attention having been drawn by occasional experiment during some years to the exudation of a viscid fluid accompanied by a strong poppy-like smell from the cutaneous pores of the Common Toad and the Great Water-Newt when under the influence of chloroform vapour, I was induced to examine more particularly into the phenomena connected with this exudation and its effects as shown by the latter (the *Triton cristatus*, or Great Water-Newt), so common in our ponds and ditches. The few notes I offer are from observation of the reptiles in the spring, when in their fullest vigour.

In their natural state, and when undisturbed, the Tritons appear to be scentless; but on being alarmed or irritated, they emit an odour strongly resembling that of bruised poppy-heads, clearly perceptible in the open air, and sufficiently powerful to attract the attention of a person coming into a room in which they are being experimented on, the smell remaining for a considerable time on a hand which has been in contact with the irritated reptile. This scent appears to be given off equally by the Tritons at all stages of growth, from the smallest I have examined, which were about a sixth of the size of the full-grown reptile, to the adult male and female, the only case in which it was not plainly perceptible being that of a female so enormously distended by fluid as to be almost unable to move.

When kept in captivity and much disturbed, the scent and the disposition to give it off, save under great irritation, appear soon to decrease; but in partially dried specimens, such as one that may have escaped from the water and have harboured in a dry room till nearly dead, the poppy-like smell is exceedingly powerful and pungent.

On placing about fifteen or twenty of the Tritons, immediately after taking them from the water, under the influence of chloroform vapour, I found that a viscid liquid was exuded from the pores of the skin, collecting over the wet surface of the animal after death in a kind of slime—this slime forming a sticky deposit on the fingers touching the reptiles, and hardening as a kind of opaque and thick varnish, but not causing pain where the skin of the hand was uninjured, though trifling injuries existing or made

whilst the fingers were still covered with the exuded matter became temporarily acutely painful.

On scraping the coagulated exudation away after the death of the Triton, a further supply of the acrid fluid emitted from the pores may be obtained in a dilute state by placing the animal in distilled water and gently pressing the tuberculated parts of the skin with the finger.

This infusion has a poppy-like smell and peculiar feel, rather than taste, in the mouth, at first acrid, numbing to the tongue, and causing a sensible degree of inflammation to the tender surfaces exposed to it, such as the inside of the lips and the upper part of the throat, the inflammatory effects lasting in my own case for many hours, accompanied (after working in the peculiar scent for about an hour) by a sense of dizziness and stupor. The exuded slimy matter appeared to have little effect when repeatedly placed in the mouth of one of the Tritons; but a specimen of *Acilius*, on being placed in water in which some Newts had been soaked for a night, gradually sickened, the limbs waving about when stirred as if powerless, and died in a few hours.

In a more dilute infusion the effects on other water-beetles of the same kind appeared variable and uncertain.

An analysis, made at my request, of the slimy exudation from the cutaneous pores of the Tritons showed its principal elements to be similar in composition to the serum of ordinary blood, and apparently separable from the blood under irritation at the will of the animal.

The enormous number of reptiles which would be required to ascertain the nature of the acrid principle contained in the exudation, throws much difficulty on the elucidation of this particular point; but the analyses, especially to discover the presence of any substance resembling the alkaloids of opium or aconite, showed matter having no alkaloidal character—the acrid and pungent constituent appearing neither acid nor alkaline, but neutral, and also highly volatile. In these characteristics the exudation from the tubercular skin of the Triton corresponds almost exactly with that from the follicles of the skin of the common Toad, as given by Dr. John Davy in his observations published in the Phil. Trans., where the exudation of the Toad is described as a thick yellowish fluid, very acrid, acting on the tongue like extract of aconite, but neither acid nor alkaline.

The effect of the poison when discharged immediately from the

skin of the Tritons upon the subject of experiment appeared usually to be far more powerful than when obtained artificially, and fully to justify the popular prejudice against these creatures. On the Tritons themselves the effect of the poison appeared to be painful and stupifying; in this case the poison could be thoroughly administered by obliging the specimen under experiment to open the mouth sufficiently to allow the tail of another to be repeatedly inserted between the jaws, where it would usually be held so firmly that the bitten one could be raised in the air suspended from the mouth of the biter. The results generally were:—first a small quantity of foam appearing round the jaws whilst attached to the bitten Newt; on being detached, the bitten one did not appear to suffer, but the biter to be in much discomfort, shown in various ways, by dilating the throat-pouches, snapping loudly with the jaws, rubbing the sides of the head as if to get rid of some adhering substance, and in one case by convulsions. The effect gradually passed away; and the circulation of the blood did not appear to be affected by it, save that in all the cases of the biting Newts which I examined, the circulation was rapid and continuous, whilst in about a quarter of the others, whether bitten or in their usual state, it appeared variable, occasionally almost entirely suspended locally, sometimes oscillatory (the blood-globules distinctly moving backwards and forwards) and returning suddenly in rapid continuous or in jerking flow.

On a strong and healthy cat being shown some of the Tritons (although recently well fed, so that he could have no inducement of hunger for attacking them), he immediately seized on them, and after gnawing them in various parts for about a minute dropped them, and was immediately attacked with a discharge of large drops of clear saliva from the mouth, followed by large strings of foam from the corners of the jaws, accompanied by violent and audible action of the jaws, as if to discharge some substance from the mouth.

On the human subject the effect appears much stronger. For the sake of exactly ascertaining the sensations (which in the lower animals could only be judged of by their apparent effects), a part of the back and tail of a live Triton were gently pressed between the teeth sufficiently to alarm the animal and cause it to give out its acrid cutaneous exudation. The first effect was a bitter astringent feel in the mouth, with irritation of the upper part of the throat, numbing of the teeth more immediately holding the rep-

tile, and in about a minute from the first touch of the Newt a strong flow of clear saliva. This was accompanied by much foam and violent spasmodic action, approaching convulsions, but entirely confined to the mouth itself.

The experiment was immediately followed by headache lasting for some hours, general discomfort of the system, and half an hour after by slight shivering fits. It was not intended that any of the poison should be swallowed, but such may have been the case to a slight degree; and none of the remedies (similarly intended merely to be held in the mouth), such as dilute ammonia, had any effect in removing the discomfort, till, about an hour after the experiment, swallowing a few spoonfuls of cream at once allayed much of the local irritation and with it the general discomfort of the system.

These observations appear to show the presence of a principle in the exudation of the Tritons which, whilst to a certain extent painful when applied to external injuries, is sufficiently powerful to cause serious disturbance by its physical effects on such of the sensitive internal surfaces as it may be allowed in ordinary circumstances to reach, and which, if acting with corresponding effect on more important organs, might, if swallowed, be probably dangerous, almost certainly exceedingly painful, in its action on the system.

To the Tritons themselves the exudation appears to act as a protection perfectly adapted to their needs as a defence against such enemies as they have most to fear from in their natural state: the spasmodic effect on the jaws, which would almost immediately ensure the Triton being dropped from the mouth of the attacking animal, joined to the temporary local pain and great discomfort, would (as far as experiment shows) be quite sufficient to distract attention from the reptile till it had time to conceal itself; and the effect as noticed by a casual passer-by would fully justify the common prejudice against the reptile, though harmless and inoffensive in its ordinary state.

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On Diversity of Evolution under one set of External Conditions.

By REV. JOHN T. GULICK.

[Read November 21, 1872.]

The terms "Natural Selection" and "Survival of the Fittest" present different phases of a law which can act only where there



is variation. The words in which the law is expressed imply that there are variations which may be accumulated in different proportions according to the differing demands of external conditions.

What, then, is the effect of these variations when the external conditions remain the same? Or can it be shown that there is no change in organisms that is not the result of change in external conditions? Again, if the initiation of change in the organism is through change in the "Environment," by what law is the cessation of change determined? If change continues in the organism long after the essential conditions of the "Environment" have become stationary, how do we know that it is not perpetual? Does the change, whether transitory or continuous, expend itself in producing from each species placed in the new "Environment" just one new species completely fitted to the conditions? or may it produce from one stock many that are equally fitted? If the latter, what is the law or condition that determines their number, their affinities, and the size and position of their respective areas, as related to each other and to the whole available area?

*Facts throwing Light on the Subject.*

I believe that in the relations of species to each other as distributed in nature, we shall find light on the subject. I call attention at this time to the variation and distribution of terrestrial mollusks, more especially those found on the Sandwich Islands; but similar facts are not wanting elsewhere.

The land-shells of the Sandwich Islands not only differ in species from those of other countries, but they belong, for the most part, to a group of genera found nowhere else. These are the *Achatinellinæ*, of which there are seven arboreal genera (*Achatinella*, *Bulimella*, *Helicterella*, *Laminella*, *Partulina*, *Newcombia*, and *Auriculella*), and three ground-genera (*Carelia*, *Amastrea*, and *Leptachatina*).

Some of these genera are confined, in their distribution, to a single island. The average range of each species is five or six miles, while some are restricted to but one or two square miles, and only a very few have the range of a whole island.

The forest-region that covers one of the mountain-ranges of Oahu is about forty miles in length and five or six miles in breadth. This small territory furnishes about 175 species, represented by 700 or 800 varieties. The fall of rain on the north-



east side of the mountain is somewhat heavier than on the opposite side, and the higher ridges of the mountains are cooler than the valleys ; but the valleys on one side of the range have a climate the same in every respect. The vegetation in the valleys differs somewhat from that on the ridges ; but the vegetation of the different valleys is much the same ; the birds, insects, and larger animals are the same. Though, as far as we can observe, the conditions are the same in the valleys on one side of the range, each has a molluscan fauna differing in some degree from that of any other. We frequently find a genus represented in several successive valleys by allied species, sometimes feeding on the same, sometimes on different plants. In every such case, the valleys that are nearest to each other furnish the most nearly allied forms ; and a full set of the varieties of each species presents a minute gradation of forms between the more divergent types found in the more widely separated localities.

No theory is satisfactory that does not account, 1st, for their being distributed according to their affinities in adjoining areas more or less distinctly defined, and, 2nd, for their being restricted to very small areas.

*External Conditions not the Cause.*

I think the evolution of these different forms cannot be attributed to difference in their external conditions :—

1st. Because in different valleys, on the same side of the mountain, where food, climate, and enemies are the same, there is still a difference in the species.

2nd. Because we find no greater difference in the species when we pass from the more rainy to the drier side, than when we compare the forms from valleys on the same side of the mountain, separated by an equal distance.

3rd. Because if, failing to find a reason in the more manifest conditions, we attribute the difference in the species to occult influences, such as magnetic currents, we must suppose that there are important differences in these hidden conditions for each successive mile, and that their power at the Sandwich Islands is a thousand times greater than in most countries.

*Separation and Variation Correlative Factors in the Evolution of Species.*

If we would account for the difference and for the limited distribution of these allied forms on the hypothesis of Evolution

from one original species, it seems to me necessary to suppose two conditions, both of which relate to the state of the species—namely, Separation and Variation. I regard Separation as a condition of the species and not of surrounding nature, because it is a state of division in the stock which does not necessarily imply any external barriers, or even the occupation of separate districts. This may be illustrated by the separation between the castes of India or between different genera occupying the same locality.

To state the conditions more fully:—

1st. We must suppose that they possess or have possessed an inherent tendency to variation, so strong that all that is necessary to secure a divergence of types in the descendants of one stock is to prevent, through a series of generations, their intermingling with each other to any great degree. This supposition is not at variance, but rather in accordance, with facts that are observed in analogous cases in the history of man and of domestic animals of one original stock, that are kept entirely apart. But this condition alone would not be enough to account for the species of *Achatinellinæ* being confined to areas so much smaller than usual; for if this tendency has produced such results in the distribution of one family, why does it not in all?

*Migration and Variation opposing Factors in the Limitation of Areas.*

2nd. To account, therefore, for the small areas, we must further suppose that, as compared with other families, there is a disproportion between the tendency to variation and the tendency and opportunities to migrate. Either the tendency to variation in this family is very much greater than usual, or their tendency to migrate is weaker and their opportunities fewer than usual. According to *à priori* reasoning, the areas occupied must vary directly as the tendency, power, and opportunities for migrating, but inversely as the tendency to variation.

If the amount of migration is greatly expanded in proportion to the tendency to variation, the areas must be expanded; if, on the other hand, the tendency to variation is expanded as compared with the amount and extent of migration, the areas occupied by the different species must be correspondingly contracted.

If the power of migrating and the opportunities for being transported are very limited in any family of creatures, we may expect

that the areas occupied by the different species and varieties of that family will be more restricted than the areas occupied by the species of other families that have greater opportunities for migrating but the same tendency to variation. When we find that in Europe and North America nearly every species of *Helix* occupies an area many thousand times as large as the area occupied by any *Achatinella*, we naturally ask whether the difference can be accounted for by circumstances that limit the dispersion of the latter, or whether the results are to be attributed to a stronger tendency to variation. It is evident that to the forest species, that live on trees found chiefly in the valleys, the mountain-ridges separating the valleys must be partial barriers; but the valleys cannot be barriers to the species occupying the ridges, for the ridges rising between the valleys are all spurs from the one central range that forms the backbone of the island. In accordance with these facts we find that the distances over which the ridge species are distributed are usually somewhat greater than those reached by the valley species. But even the ridge species are limited in their distribution to very small areas. Few have a range of territory more than six or eight miles in length and three or four miles in breadth; and many are restricted to half that area. Though some of the groups of species are found both in the valleys and on the ridges, so that no barriers intervene to break the continuity of their intercourse, we still find them distributed over small areas, and these areas again divided amongst subordinate varieties. The streams that flow through these valleys cannot serve in carrying the shells from one valley to another; but the separation from this cause can be no greater than that which is experienced by mollusks inhabiting mountain-valleys in other countries. It therefore appears that the limited range of the species of this family receives but slight explanation from the nature of the country. Neither can we suppose that the power of locomotion in this family is so immeasurably below that possessed by the *Helices* of Europe and America, and by the *Achatinæ* of Africa, as to account for the excessive disproportion in the areas occupied, as well as in the amount of divergence, between the types found in any locality and those found at given distances. In Africa some of the species of *Achatina* have a range of more than a thousand miles, while on the island of Oahu the most widely diffused species of the arboreal genus *Achatinella* is restricted to about ten miles, and the utmost limit gained by any

species of the ground-genus *Amastra* is about twenty miles. Again, the difference of type is quite as great between the species of *Achatinella* found in the mountains near the eastern end of Oahu and those found forty miles distant, on the other end of the same range of mountains, as the difference between the species of *Achatina* found in Sierra Leone and those in the region of Port Natal, nearly four thousand miles distant.

The birds that prey upon these snails are probably few; but the forests are populous with fruit- and nectar-feeding birds, that might be supposed to give as effectual means of transportation as could be given by any. The number of species represented by these birds is no doubt less than would in most cases be found in an equal extent of continental forest; but the number of individuals is probably greater than the average number inhabiting equal areas in other parts of the world.

If we find no reason for attributing the small areas occupied by these species to deficient means of transportation, may we not believe that rapidity of variation has had influence in determining the result?

#### *Stability of Type as affected by Cultivation.*

It is known that there is a great difference in the stability of type in different species of plants and animals that have been subjected to cultivation. One produces striking varieties in a single generation; another requires careful selection of certain characters for many generations before well-marked varieties can be secured. We also know that continued cultivation will, in many instances, break down the stability of type in a species that, in the first place, adhered with great persistency to one form. It often happens that when the stability has once been disturbed, a wide range of variation may afterwards be obtained with comparative rapidity.

Is it not possible that similar changes may sometimes take place in species in their wild state? Two important elements of the cultivation which tends to develop varieties are the removal of competitors and enemies, and the abundant supply of nourishment; but both these conditions may sometimes be furnished by nature without the intervention of man.

#### *The Natural Selection that prevents Variation.*

The more severe the competition the more rigidly does Natural Selection adhere to the one form that is best suited to meet that



competition, or, according to the language in which Professor Owen has stated the doctrine, the more certainly does the "Battle of Life" extinguish all variations from that one form. When a species is subjected to severe competition of the same kind for countless generations, we may well believe that it gains a stability of type that is not found in one that has during the same time been, either comparatively free from competition, or under the influence of a succession of different competitors and enemies\*.

*Stability of Type in Island Fauna may be impaired :—*

*1st. By Freedom from the Competition that limits Variation.—*

We can see that when animal life commences upon an island where vegetation has already become abundant, the first species that appears on the arena, unless immediately followed by other creatures capable of being either friends or foes, will enjoy for a time complete freedom from competition. If the vegetation is suited, it will also have an abundance of food. Under these circumstances every variation that occurs, unless decidedly malformed, will have a chance of living and exerting an influence upon the final result.

*2nd. By Competition accelerating Variation.—*If the introduction of competitive animals is long delayed, the first struggle for life will occur between the members of the one stock. But competition of this kind does not tend to prevent variation, but rather to accelerate it, by driving portions of the race into new spheres. Supposing the animals first inhabiting the island to be a species of arboreal mollusks, there would soon be an excess of occupants on the trees best suited to them in the region where they first appeared. The portion of the population that would survive this exigency would, in the first place, be those that found sustenance on trees of other kinds. Some of these would either themselves, or through their descendants, reach localities where the trees are again found on which the stock commenced its career. Those that, in this way, returned to the original trees, would have acquired some new tendencies to variation through the ordeal through which they had passed; and those that remained upon the other kinds of trees would rapidly develop new characters: in either case, there would be no outside competition limiting them to one definite form. New forms of variation would

\* The only terrestrial mollusks with which the *Achatinellinae* have to compete are a few *Helices* much inferior in size, and not arboreal in their habits.



have an opportunity of being preserved. New shades of colour, for example, would not expose the owners to the attacks of enemies. Variations of shape, if not inconsistent with the pursuit of food, would be no disadvantage.

*3rd. By continual Change in the Character of the Natural Selection.*—Still further, we can see that when competition arises from the *gradual* introduction of animals, either friendly or hurtful to the first occupants, the character of the Natural Selection, to which they would thus be subjected would be continually changing; no one set of characters would have constant advantage through a long series of successive generations.

In these ways the persistence of form might be impaired, and the variability which we may believe exists in some degree in all organisms might be greatly increased beyond what is usually found. This tendency to comparatively rapid variation having been established, the evolution of species would be correspondingly rapid, and the areas of each proportionately limited.

*Imaginary Case, illustrating Evolution without change in the External Conditions.*

If a bird should carry a leaf bearing two individuals of some species and drop it a mile beyond the limits already reached by others of that species, they might there find the same trees to which they were accustomed, and multiply for some tens of years before the first scattering individuals from the slowly advancing wave of migration would reach them. They might, by this time, have increased to many thousands; and having been entirely separated from the original stock for a considerable number of generations, with a preexisting tendency to rapid variation, a certain variety of form and colour might have partially established itself amongst them. The arrival of a few individuals representing the old stock would, amongst the multitudes of the new variety, have no influence in bringing back the succeeding generations to the original form. The new characters would become from year to year more distinctly set. Owing to an intervening ridge acting as a partial barrier, the number of individuals of the original stock coming amongst them might be always restricted; and even if no such barrier existed, the individuals arriving from abroad could never be more than a very small number compared with those produced on the spot and possessing the local characteristics.

*Changes produced by the Introduction of Enemies.*

At this point one other inquiry naturally arises :—If the multitude of varieties and the restricted distribution of both varieties and species is in any degree due to freedom from severe competition, what would be the effect if, by degrees, many birds and insects, hostile to these snails, should find their way to the Sandwich Islands and become numerous in those mountain-regions? One of the first effects would naturally be the disappearance of many varieties and species by which the different forms of each genus are now so minutely gradationed together. Certain protective colours would be made to prevail, to the partial exclusion of some of the brilliant contrasts of colour. The same enemies being found in all the valleys of an island, the forms that proved to be best fitted to survive in one valley would have the advantage everywhere, and therefore gradually spread from valley to valley. The distribution of species and their separation from each other by distinct forms would thus become similar to what is found in the case of continental species.

The destruction of forests by the introduction of cattle and goats is now causing the extinction of some of the species.

*Recapitulation and Conclusion.*

A comparison of the distribution of island mollusks with the widely contrasted distribution of continental species, leads me to believe that the evolution of many different species may take place without any difference in the food, climate, or enemies that surround them. The rapidity of evolution or the time within which a certain amount of change is effected must depend upon the average amount of change in one direction in a single generation, and the rapidity of succession in the generations. Ten thousand years would make but little difference in a species of cedar, in which the life of a single tree might count a third of that period. But in the case of some species of insects the same period might cover ten thousand generations; and though the change in each generation might be as imperceptible as in the cedar, the aggregate of change for the whole period might be very apparent.

We must also bear in mind, the Natural Selection arising from severe competition with species that have a wide range tends to prevent variation and give a wider diffusion to forms that would

otherwise be limited in their range and variable in their type. Natural Selection is as efficient in producing permanence of type in some cases as in accelerating variations in other cases.

If we suppose separation without a difference of external circumstances is a condition sufficient to ensure variation, it renders intelligible the fact that, in nearly allied forms on the same island, the degree of divergence in type is in proportion to the distance in space by which they are separated. The difference between two miles and ten miles makes no change in climate; but it is easy to believe that it is the measure of a corresponding difference in the time of separation. In forms that differ more essentially, the separation may have been as complete and as long-continued in the case of those which now inhabit one valley as in the case of those which are separated by the length of an island. When a wide degree of divergence has been established, hybridation would be precluded. We accordingly find that the difference between species of different genera or subgenera is in most instances equally great whether we take for comparison those from the same or from different valleys.

If, on the other hand, we suppose that a difference in the external conditions is necessary to the evolution of distinct forms, these and other similar facts remain unexplained.

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Notes on *Kerophia crassirostris*, Gml. ("Piopio").

By THOMAS H. POTTS, Esq., F.L.S.

[Read November 7, 1872.]

IN writing on the natural history of our birds, the bewailment of their lessened numbers has come to be a matter of course. The rapid settlement of the colony, in the case of the Thrush, has limited its range greatly; few birds have retreated with so much haste before the efforts of the cultivator.

Let us take a section of this island, say a hundred miles in width (including Banks's Peninsula) and stretching from the eastern to the western shore; this will afford some information as to its present habitat.

Within this given range at one time the Piopio might be found in any bushy place not too far from water, where belts of shrubs afforded shelter and abundance of seeds; ten years at least have passed since we heard of its occurrence in this neighbourhood

(Governor's Bay on Banks's Peninsula); it is now scarce in the bush-dotted gullies of the Malvern Hills, the Thirteen-mile Bush, Alford Forest, and in many other localities where it was not very uncommon. Let an enthusiastic naturalist now traverse these places in quest of our feathered philosopher, he will find he has become a *rara avis* indeed.

Now we must pass through those portals of the mountains, the river-gorges, to catch sight of the Thrush hopping about the openings in the bush, much after the fashion of his English namesake; but even here its numbers have wofully diminished. Four or five years ago on either side of the Upper Rakaia, where the bushes descend the mountain-slopes, these birds fairly teemed in their favourite haunts; they are already becoming rare. They may be seen about the bushes that skirt the cold streams of the Havelock, the Upper Waimakariri, and the Bealey, through the romantic gorge of the Otira to the more level ground that stretches away to the Teremakau; there it may be frequently heard and seen, always appearing to prefer the timbered forests, the mixed scrub made up of moderate-sized bushes of *Olearia*, *Coriaria*, *Veronica*, and *Coprosma*.

We have now almost reached the western coast. About the Arahura river it was, three years since, most abundant. Last December we searched one of their former favourite haunts (a large island in that river, more or less covered with scrub-bush dotted with ti trees); two or three specimens only were to be seen. They have been driven away from Arahura by the clearances for paddocks to supply the requirements of west-coast cattle-trade.

Last December, in travelling along the coast from Ross to Okarito, we saw this bird in abundance on the face of those bluffs which form such picturesque breaks in that journey; up the river-flats it was equally numerous.

Settlers have given the name of the Thrush to the Piopio, from its size and brown plumage recalling their favourite of the old country: it possesses not in the slightest degree that charm of song which distinguishes the Thrush; yet it enjoys the power of giving utterance to several pleasing notes.

It does not stir so early as many other birds; its morning salute is a long-drawn rather plaintive note; this peculiar whistle it indulges in at times only. Its habit, when close to the water, is to pipe thrice in a way that at once recalls the Red-bill (*Hæmatopus*); the imitation is so like, that the writer and his



son (well acquainted with birds' notes and calls) were frequently deceived, and have looked for a Red-bill till the Piopio disclosed himself by fluttering from bush to bush.

Its common song seems to be near akin to that of the Lark (*Anthus Novæ Zealandiæ*); it sounds two preludatory notes, then tinkles off a very brief song. When joyously flying in pursuit of the female, it utters a quick chi, chi, chit, chi, chi, chit. It marks its displeasure, or tries to intimidate intruders that approach its nest with a low purring churr; both cock and hen join in this cry of anger. When singing, the effort is marked by the tail being spread, the wings held not quite close; the feathers of the breast and back are not raised, as in the case of the Bell-bird and some other arboreals.

We have called this Piopio a philosopher; he has quite as good a claim as many a biped to whom that title is accorded. Who doubts this, let him try to have some knowledge of this bird with the thick bill, not merely a know-him-by-sight acquaintance, but such a one as ripens into friendly intimacy; the result will be to know a bird that takes the world as it is, not fanciful as to the kind of food—that feeds with zest on insects when procurable, or can make shift on seeds, fruits, or even grasses—that neither courts nor avoids observation, is as bold as the Robin or Tit, without their intrusiveness—that in the presence of strangers coolly pursues its occupation without the prying of the Brown Creeper or the watchful distrust of the Popoketea—that defends his home with almost the courage of the Falcon or Tern.

It seems to delight in those openings which are found in river-beds, between long belts of tutu and other scrub; there it may be observed either hopping along the ground or fluttering about the lower sprays of shrubs, flying out to the spits of sand or drifted trees that lie stranded in the river; on some of the larger spits that are becoming clothed with vegetation it searches amongst the burry *Acæna*, snips off the fruit-stalks of moss, picking the seeds of some trailing *Veronica*.

Its progress on the ground is usually deliberate; it hops with both feet together, a slight flutter of the wings, a flirt of the tail accompanying each motion. When approached too closely, it leaves its perch by always descending at first, as though safer when near or on the ground; if it would rise on the wing, a momentum is gained by a succession of hops. In some of its habits one is reminded pretty often of the Wattle-bird (*Callæas*) Its



usual associates, at any rate during the summer months, are Tuis, Perroquets, and Cobins; and many a long stretch of river-bed, fragrant with many flowering shrubs, resounds with their varied notes. Not much secretiveness is displayed in the choice of a site for its nest, which may be found at varying distances above the ground, from 4 to 12 feet and upwards, usually at 7 or 8 feet. The structure is firmly and compactly built, with small sprays for the foundation, on which moss is abundantly interwoven with pliant twigs; the lining is usually of fine grass-bents, though some nests are finished off with soft tree-fern down, and are usually placed in Tutu (*Coriaria*), sometimes in *Coprosma* or *Leptospermum*.

Rivals of its own species, as well as other birds, are driven off most resolutely from the neighbourhood of its home.

Probably it breeds twice in the season. Although we have not observed more than two eggs to a nest, yet we have found four eggs tolerably formed in the ovary of a female killed at Christmas-time; the proper complement of eggs is probably four to a nest. The egg is of ovoid, sometimes elongated, form, pure white, spotted with blackish brown or black, purplish at the edges of the spots; sometimes the egg is of a delicate pinkish tinge, just staining the white, spotted with brownish grey, with purplish blotches at the larger end.

From a nest found at Arahura we have an egg that exactly resembles in its colour and marking that of *Oriolus galbula* of Europe. In size this specimen measures through the axis 1 inch  $3\frac{1}{2}$  lines, with a diameter of  $11\frac{1}{2}$  lines.

From the river Waio, in a nest about 12 feet from the ground, in a bush of *Coriaria*, the eggs, two in number, were of elongated form, and measured in length 1 inch 7 lines, by nearly an inch in width.

December 27th. River Waio; found a nest in a small-leaved *Coprosma* (probably *rhamnoides*), the hen incubating a single egg; she remained on the nest until pushed off; the cock bird was summoned by a jarring call; and both birds joined in a bold defence.

Near Lake Mapourika, in a very swampy situation, we found a nest with the walls very thickly built of moss and Manuka sprays interwoven; it was placed about 15 feet from the ground in a tall Manuka. After looking at scores of nests, the dimensions, we find, average:—across the top, from outside of wall to

outside, about 7 inches; diameter of cavity about 3 inches, with a depth of 2 inches. When the young emerge from the shell, they have a covering of dark brown. We think the eye of the *Piopio* gleams with intelligence; perhaps this notion is conveyed by its narrow but light pale yellow iris; the tongue is pointed, furnished on the inferior side with a strong muscular process of almost horn-like consistence. Both skin and flesh are dark; but the flavour of the bird is not at all bad; it makes a savoury broil for those who bring the proper sauce; when not so provided, they do wanton mischief that kill a bird so harmless and interesting.

We noticed the Thrush flying from the top of a tree after insects, Flycatcher-fashion, in the glow of a hot afternoon.

Ohinatahi.

Descriptions of Buprestidæ collected in Japan by GEORGE LEWIS, Esq. By EDWARD SAUNDERS, F.L.S.

[Read February 20, 1873.]

THE following species of Buprestidæ form part of the large collection of insects made by Mr. George Lewis in Japan. The fauna of that island is so peculiar, that I thought a Table showing the distribution of its genera in other countries would be useful. Such a Table is almost necessarily drawn up from the described species only; but I think that, with the notes I have given, a fairly true idea may be obtained.

	Japan.	China.	Philip- pines.	India, Isles, and Aus- tralia.	Africa.	Europe, &c.	America.
<i>Chrysobothris</i> .....	1	1	2	30	1	.....	.....
<i>Chrysodema</i> .....	1	.....	5	24	.....	.....	.....
<i>Chalcophora</i> .....	2	.....	.....	1	.....	8	9
<i>Buprestis</i> .....	1	.....	.....	4??	1	19	25
<i>Anthaxia</i> .....	1	.....	.....	5	10	74	19
<i>Chrysobothris</i> ...	1	.....	.....	49	8	9	131
<i>Ptosima</i> .....	1	1	1	1	.....	2	2
<i>Corcebus</i> .....	2	.....	1	19	.....	5	.....
<i>Sambus</i> .....	1	.....	.....	12	1	.....	.....
<i>Cryptodactylus</i> ...	1	.....	.....	3	.....	.....	.....
<i>Agilus</i> .....	11	1*	1	1416	32	65 <sub>5</sub>	162†
<i>Cylindromorphus</i>	1	.....	.....	.....	.....	7	.....
<i>Trachys</i> .....	11	1	.....	45	13	13	.....
<i>Paratrachys</i> .....	1	.....	.....	*	.....	.....	.....

\* An undescribed species.

† About as many again still undescribed.

The underlined figures indicate the country whose species the Japanese forms most closely resemble. Thus in *Chrysochroa* the species found in Japan is allied to the Indian and Chinese species. In *Agrius* 5 species are of European facies and 6 of Indian.

It appears that 13 out of the 14 genera exist also in India, 7 in Africa, 9 in Europe, 6 in America, 5 in the Philippines, and 4 in China.

In all, I have described 34 new species, for one of which I have created a new genus, "*Paratrachys*." The species previously characterized are merely noted for the sake of making the list of the collection complete.

*CHRYSOCHROA FULGIDISSIMA*, Schoen., *Syn. Ins.* iii. p. 229.

Several specimens.

*CHALCOPHORA QUERCETI*, E. S. Capite cupreo, rugoso. Thorace rugoso-punctato, cupreo, tribus lineis lævibus olivaceis, quarum dorsali angustissime canaliculata. Elytris viridi-cupreis, utrinque quadricostatis, maculis plurimis parvis albo-tomentosis ornatis. Subtus viridi-cuprea, punctata.

Head coppery, rugose, excavated between the eyes. Thorax with its sides slightly rounded; base straight. Surface coppery and rugose, with three smooth rather wide longitudinal lines of an olive-green colour, the dorsal one of which is finely sulcate. Elytra coppery, with greenish reflections, each with four raised lines, and covered with numerous small punctured foveæ, many of which are filled with white pubescence; sides denticulate posteriorly. Beneath and legs coppery, covered with short white hairs.

Length 10 lines. Breadth  $3\frac{1}{4}$  lines.

*Hab.* On the oak.

N.B. Should follow *amabilis*, Vollen.

*CHALCOPHORA JAPONICA*, Gory, *Mon. Suppl.* p. 81, pl. xiv. fig. 77.

Several specimens.

*CHRYSODEMA LEWISII*, E. S. Capite obscure viridi, excavato. Thorace cyaneo, aureo punctato, linea dorsali elevata lævi, lateribus inauratis, subrugosis, longitudinaliter impressis. Elytris cyaneis, aureo-punctatis et subrugosis, sutura viridi, lateribus utrinque linea impressa aurea ornatis, marginibus postice denticulatis. Subtus viridi-aurea.

Head punctured, green on the vertex, cyaneous and excavated between the eyes. Antennæ cyaneous black, basal joint punctured with green. Thorax cyaneous, covered with golden green punctures on the disk; dorsal line raised and smooth; sides each with an impressed

longitudinal line, which is closely and rugosely punctured; the punctures golden; base and front margin straight; sides very slightly rounded. Elytra cyaneous on their raised parts, covered with lines of golden punctures (three or four punctures generally forming each depression); each elytron has two slightly raised cyaneous lines on its disk. Sides each with a golden fovea extending from the shoulder to the apex; between this and the margin is a well-marked cyaneous costa. Suture green. Posterior margins denticulate; apex pointed. Beneath and legs green-punctured.

The underside and marginal foveæ are covered with yellow powdery pubescence.

Length 10 lines. Breadth 3 lines.

*Hab.* On the oak.

One specimen.

*BUPRESTIS JAPANENSIS*, *E. S.* *Ænea*, capite plano, punctato. Thorace punctato, linea dorsali lævi. Elytris punctatis et leviter punctato-striatis, apicibus truncatis, bidentatis. Subtus ænea, apice rufo bimaculato.

Entirely dull bronzy above. Head rugosely punctured (in some specimens red). Thorax punctured, especially at the sides; dorsal line and a small space on each side smooth; the former is met at the base by a triangular puncture; sides nearly straight. Elytra punctured, sparsely on the disk, closely on the sides, and punctate-striate; the interstices flat. There are two or three irregular depressions on the sides, as in *rustica*, *L.*, *punctata*, &c. Apex of each elytron truncate and bidentate. Beneath bronzy, covered with a short greyish white pubescence, apical segment of abdomen with two red spots.

Length 9 lines. Breadth 3 lines.

*Hab.* On the fir.

Very near *punctata*, but larger, and with straighter sides to the thorax, and with flatter interstices to the elytra; it may probably prove to be only a variety.

*ANTHAXIA PROTEUS*, *E. S.* Læte viridis, capite plano. Thorace minutissime punctato, reticulato, lateribus rotundatis, basi recta. Elytris punctatis et minutissime rugulosis, lateribus inauratis, apicibus rotundatis; subtus viridis, albo pilosa.

Bright green. Head flat, finely reticulated. Thorax with the anterior margin very slightly produced, sides rounded, base straight, surface finely reticulated and extremely finely and rugosely punctured; in some lights the disk appears clouded, and the anterior margin and hind angles alone bright. Elytra punctured and very finely rugose; sides with a very slight golden-coppery tinge; apex rounded; suture raised posteriorly. Beneath and legs, which are very slender and long, green, white-pubescent.

Length 2 lines. Breadth  $\frac{5}{6}$  line.

*Hab.* Japan.

*Obs.*—The entire insect has a silken sheeny appearance, the colour changing remarkably according to the light the insect is held in. There are some specimens before me in which the elytra are coppery-golden and the thorax slightly darker, its anterior margin and angles alone golden-green.

*PTOSIMA CHINENSIS*, *Mars., An. Soc. Ent. Franc.* vii. 1867, p. 54.  
Several examples.

*CHRYSOBOTHRIS SUCCEDANEA*, *E. S.* Capite viridi-æneo, cupreo-micante, punctato, fronte transverse carinata. Thorace purpureo-fusco, transverse rugoso et punctato, lateribus cupreis. Elytris purpureofuscis creberrime punctatis, tribus foveis aureis utrinque notatis; sutura prope apicem viridi. Subtus aureo-viridis, lateribus tibiisque roseo-cupreis.

Head bronzy, with green and coppery reflections, transversely rugose, and with a strong transverse keel. Thorax purplish brown, with the sides coppery, slightly wider behind than in front; sides nearly straight; posterior angles largely rounded; base deeply bisinuate; surface deeply punctured and transversely rugose; on each side, parallel to and very near the margin, is a well-marked carina. Elytra brown, with a purplish tinge, deeply and very closely punctured, each with three golden foveæ—one at the base (a small one), one just above, and the other just below the middle. Besides these, there is a little green spot just behind each shoulder, and a streak of green on the suture just above the apex; sides denticulate posteriorly. From the apex a carina runs up parallel to the suture till it reaches the middle fovea; another runs parallel to the side as far as the shoulder. Beneath punctured, golden green, with the sides and tibiæ rosy copper-colour.

Length  $4\frac{1}{2}$  lines. Breadth 2 lines.

*Hab.* Japan.

*CORÆBUS IGNOTUS*, *E. S.* Capite thoraceque aureo-cupreis, sparse flavo-pilosis. Elytris cupreo-fuscis, minutissime rugosis, utrinque tribus fasciis sinuatis maculaque apicali ornatis, fasciis duabus anticis interruptis, apicibus rotundatis. Subtus æneus, aureo-pubesceus.

Head rugosely punctured, golden coppery, impressed between the eyes, and golden pubescent. Thorax golden coppery, clouded on the disk, rugosely punctured; sides covered with yellow hairs; posterior angles and base depressed, so as to give the disk a raised appearance; side margins finely crenulate; base bisinuate. Elytra finely rugose, coppery brown in front, purplish black posteriorly and along the suture; on each is a small round spot below the base, an irregular narrow



band just above the middle, a well-marked zigzag band just below it, and a short band close to the apex, which are golden pubescent; apex rounded; sides very finely denticulate posteriorly. Beneath bronzy, punctured, covered with golden hairs.

Length  $4\frac{1}{2}$  lines. Breadth  $1\frac{1}{2}$  line.

*Hab.* Japan.

*SAMBUS QUADRICOLOR*, *E. S.* Capite igneo-cupreo, tumido, vertice canaliculato. Thorace igneo cupreo punctato et striato, lateribus lineaque dorsali albo-pubescentibus. Elytris antice aureo-pilosis, postice nigris, fascia alba utrinque nigro bimaculata ornatis, apicibus rotundatis. Subtus nigro-æneus.

Head and thorax fiery copper-colour, the former much swollen on the vertex, with a few golden hairs above the mouth. Thorax with the sides rounded in front and slightly emarginate near the posterior angles; surface deeply punctate and concentrically striate; sides and base depressed; disk very convex; lateral carinæ very strongly marked; sides and dorsal line grey-pubescent. Elytra with the sides slightly sinuate above the middle; apex largely rounded; surface finely rugose; upper three fifths of elytra golden pubescent; rest black; in the middle of the black portion is a grey band, which has two small black spots in it on each elytron; suture, just above the black part, grey. Beneath and legs bronzy black, covered with depressed white hairs.

Length  $2\frac{3}{8}$  lines. Breadth  $1\frac{1}{8}$  line.

*Hab.* Japan.

*CRYPTODACTYLUS AURICEPS*, *E. S.* Caput aureum, inter oculos impressum, rugosum. Thorax niger, transverse rugosus, trifoveolatus, lateribus valde rotundatis. Basi lobata. Elytra nigra, utrinque macula circulari prope suturam, altera oblonga inter eam et marginem, duabusque fasciis valde sinuatis prope apicem, albo-pilosis ornata, apicibus rotundatis. Subtus punctatus.

Head golden, impressed between the eyes, and concentrically striate and punctured. Thorax black, with the anterior margin produced, the sides much rounded, and the base deeply bisinuate; surface concentrically striated, and with three large foveæ, a somewhat round one on the dorsal line near the anterior margin, and an ear-shaped one on each side extending from the base of the dorsal region to the posterior angle. Scutellum golden. Elytra black, with an irregular basal band, a circular spot on each side near the suture, an oval longitudinal spot placed slightly below it but nearer the margin, and two zigzag bands above the apex white-pubescent; surface finely rugose; apex rounded. Beneath black, punctured.

Length  $3\frac{1}{2}$  lines. Breadth 1 line.

*Hab.* Japan.

*AGRILUS TRINOTATUS*. *Æneus*. Capite punctato. Thorace trans-

verse rugoso, linea dorsali lateribusque impressis. Elytris minute rugosis apicibus rotundatis, macula indistincta media duabusque maculis parvis inter illam et apicem albo-pilosis. Subtus æneus, punctatus, albo pubescens.

**Bronzy.** Head rather swollen, rugosely punctured. Thorax transversely rugose; sides nearly straight in the middle and converging to the angles; disk with two impressions on the dorsal line; sides also impressed; lateral carina extending about half the length of the side and curved. Elytra finely rugose; apex rounded, very finely denticulate; disk with a very obscure grey pubescent spot just below the middle; between this and the apex are two small triangular silvery spots set side by side on the edge of the suture. Beneath and legs bronzy, punctured.

Length 3 lines. Breadth 1 line.

*Hab.* Japan.

**AGRILUS MACULIFER, E. S. Æneus.** Capite viridi, albo-piloso. Thorace dorso lateribusque impressis, albo-pubescentibus. Elytris albo-pilosis, fascia magna discali, macula parva apicali, maculaque parva rotundata inter basin fasciamque mediam æneis. Subtus æneus, albo-pubescens.

**Bronzy.** Head green, covered with white hairs. Thorax with the anterior margin nearly straight; sides converging from the anterior angles in almost straight lines to the base; base bisinuate; disk with the dorsal line impressed and filled with white hairs, and met at the base by a large oval transverse fovea; sides depressed; lateral carina short and nearly straight. Elytra bronzy brown, covered with white silvery hairs, with the exception of an irregular band at the middle, which is deeply cleft at the suture on its upper margin (in fact forming a very irregular zigzag), of a small spot between it and the apex, and of another between this and the base; sides sinuate below the shoulders; apex rounded. Beneath dull bronzy, covered with grey silky hairs.

Length  $2\frac{1}{2}$  lines. Breadth  $\frac{2}{3}$  line.

*Hab.* On a species of grass.

Somewhat like the following in style of markings, but quite different in shape and colour.

**AGRILUS DISCALIS.** Fusco-cupreus. Capite antice æneo, albo-pubescente. Thorace transverse rugoso, lateribus albo-pilosis. Elytris albo-pubescentibus, macula magna triangulari discali apiceque læte cupreis. Subtus aureo-pubescens.

Head coppery, bronzy in front, longitudinally rugose on the vertex, covered with very short white hairs between the eyes. Thorax coppery brown, transversely rugose; dorsal line and sides slightly impressed and covered with a silvery pubescence; sides rounded. Elytra finely

rugose, with a large triangular or somewhat diamond-shaped spot on the disk, and their apex brilliantly copper-coloured; the rest covered with silvery-grey hairs, although very sparsely near the shoulders; apex slightly produced and denticulated. Beneath bronzy, covered with golden hairs.

Length 3 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* On a species of grass.

*AGRILUS CYANEONIGER*, *E. S.* Capite vertice nigro, fronte aurea, excavato. Thorace nigro, lateribus cæruleis, disco longitudinaliter biimpresso transverse rugoso. Elytris minute rugosis, nigris, apicibus rotundatis, denticulatis. Subtus cyaneus.

Head black and longitudinally rugose on the vertex, golden above the mouth, having two impressions between the eyes, and deeply punctured. Thorax black, with the sides cyaneous; anterior margin slightly produced; sides nearly straight in the middle, and converging to the anterior and posterior margins; base deeply bisinuate; disk transversely rugose, with two wide impressions on the dorsal line; there is also a fovea above each lateral margin. Elytra covered with very short dark-grey pubescence, black, with a slight greenish tinge, very finely rugose; apex of each rounded and denticulate. Beneath cyaneous, punctured, grey-pubescent.

Length  $5\frac{1}{2}$  lines. Breadth  $1\frac{1}{2}$  line.

*Hab.* Japan.

*AGRILUS PILOSOVITTATUS*. *Æneus*. Capite inter oculos viridi, albo-piloso. Thorace transverse rugoso, lateribus foveaque basali impressis, carinis lateralibus arcuatis. Elytris breviter albo-pilosis, sutura ipsa nuda. Subtus æneus, albo-pilosus.

Bronzy. Head green, and covered with white hairs in front; bronzy and rugose on the vertex. Thorax dull æneous, transversely rugose; sides nearly straight and impressed above the lateral carinæ, which are almost semicircular; there is also an oval impression just above the scutellum; base bisinuate; median lobe slightly emarginate. Elytra covered with a short white sericeous pubescence invisible in certain lights. Looking straight down on the insect, it would appear to have its suture, margins, and apex destitute of hairs; but on closer examination, the suture only will be found naked; sides slightly swollen behind the middle; apex rounded. Beneath bronzy, covered with short white hairs.

Length 2 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* Japan.

*AGRILUS VIRIDI-OBSCURUS*, *E. S.* Capite thoraceque æneis. Thorace fortiter transverse rugoso, lateribus basique foveolatis, angulis posticis viridibus. Elytris rugosis, viridibus; sutura, præsertim postice, ænea. Subtus ænea.

Head and thorax æneous, the former very strongly punctured and narrowly channelled between the eyes; the latter with hind angles green; its sides rounded, slightly narrower behind than in front; surface very deeply punctured and transversely rugose; lateral carina on each side curved, and forming the margin to an elongate lateral fovea, which spreads out towards the base, but does not quite touch it; above the scutellum is an oval depression, and another very slight one near the front margin on the dorsal line. Elytra finely rugose, green; suture bronzy, the colour spreading out towards the apex, which is rounded; suture raised on its posterior third. Beneath and legs bronzy, punctured.

Length 2 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* Japan.

*AGRILUS MARGINICOLLIS*, *E. S.* *Æneus*. Capite inter oculos viridi. Thorace dorso bifoveato, transverse rugoso, lateribus foveatis, inauratis. Elytris rugosis; sutura albo-pilosa. Subtus æneus, albo-pubesceus.

Head golden green, punctured. Thorax bronzy, with the anterior margin produced and rounded; sides with their margins golden, slightly and regularly rounded; lateral carinæ curved; surface transversely rugose; dorsal line with an oval impression just above the scutellum, and another below the anterior margin, which are almost united in the middle; sides impressed in front above the lateral carinæ. Elytra bronzy, finely rugose, white-pubescent along the entire length of the suture, the pubescence spreading at the base so as to reach above the shoulders on either side, and interrupted about a third from the apex. I doubt whether the latter character will prove constant; but it occurs in the four examples I have before me; apex rounded, finely denticulate. Beneath and legs bronzy, covered with white hairs.

Length 2 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* Hiogo, April 1871.

*AGRILUS SUBROBUSTUS*. Robustus, aureo-æneus. Capite punctato, fronte plana, vertice canaliculato. Thorace punctato-ruguloso, prope scutellum depresso; lateribus rectis, carinis brevibus subrectis. Elytris minute rugulosis, sutura postice albo-pilosa, apicibus rotundatis. Subtus æneus.

Robust, golden bronzy. Head green in front and rugose, channelled on the vertex. Thorax with the anterior margin much produced; sides straight; base trisinate; surface deeply punctured and transversely rugose; just above the scutellum is a round impression; lateral carinæ very short and somewhat straight. Elytra finely rugose; apices rounded; posterior portion of the suture narrowly white pubescent; sides of the body protruding beyond the elytra and covered with a grey pubescence. Beneath bronzy, grey-pubescent.

Length  $2\frac{3}{4}$  lines. Breadth  $\frac{3}{4}$  line.

*Hab.* On oaks, Nagasaki.

*AGRILUS AURIVENTRIS*, *E. S.* *Æneus*. Capite inter oculos viridi, vertice canaliculato. Thorace transverse rugoso, foveis duabus dorsalibus, lateribus foveatis, inauratis. Elytris nigro-æneis, apicibus denticulatis, antice maculis irregularibus, postice fascia valde bisinuata, aureo-pilosis ornatis. Subtus aureus, pubescens.

Head flat in front, golden green, bronzy and slightly channelled on the vertex. Thorax widest in front, bronzy; sides golden; surface transversely rugose and punctured; dorsal line marked by an impression at the base and at the anterior margin; sides foveated in front; lateral carinæ short and curved. Elytra finely rugose, bronzy black apex of each sharply denticulate, in front marked with numerous gold pubescent spots; behind the middle is a zigzag band, and a spot near the apex, of the same colour. Sides of body projecting beyond the elytra, golden. Beneath golden, punctured, covered with short grey hairs.

Length 4 lines. Breadth 1 line.

*Hab.* Japan.

*AGRILUS MÆRENS*, *E. S.* *Æneus*. Capite inter oculos punctato, albo-piloso. Thorace transverse rugoso, fovea parva rotundata basali; lateribus foveatis, inauratis. Elytris minute rugosis, apicibus rotundatis, minutissime serratis. Subtus æneo-niger, albo-pubescens. Pedibus aureis.

Head bronzy, deeply punctured between the eyes, and covered with long white hairs. Thorax bronzy black, widest in front, punctured, and rugose in transverse wavy lines; dorsal line impressed widely at the base, so as to form a small fovea; sides foveated in the middle and golden; lateral carina very short and straight, in fact, hardly observable. Elytra bronzy black, finely rugose; apices very finely denticulate. Beneath punctured, white-pubescent. Legs golden.

Length 2 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* Japan.

*AGRILUS ROTUNDICOLLIS*, *E. S.* *Cyaneus*. Capite inter oculos punctato et albo-piloso. Thorace lateribus rotundatis, transverse rugoso, linea dorsali antice et supra scutellum impressa, lateribus foveatis. Elytris minute rugosis, apicibus rotundatis. Subtus punctatus.

Cyaneous blue. Head punctured and covered with white hairs above the mouth. Thorax with the sides rounded; surface transversely rugose and punctured; dorsal line met in front by a transverse impression, and at the base by an oval longitudinal fovea; sides also foveated about the middle; lateral carinæ well marked and but slightly curved. Elytra very finely rugose; extreme edges of the suture black; apex



of each rounded, very finely denticulate. Beneath punctured, covered with extremely short white hairs.

Length 2 lines. Breadth  $\frac{2}{3}$  line.

*Hab.* Japan.

*APHANISTICUS COLLARIS*, *E. S.* Capite cupreo, valde excavato et punctato. Thorace æneo-cupreo, postice attenuato, lateribus rotundatis, disco transverse bicarinato, carinis cupreis. Elytris aureo-æneis, depressis, transverse rugosis, apicibus rotundatis. Subtus æneus.

Head coppery, very widely and deeply excavated between the eyes and punctured. Thorax widest in front; its anterior margin raised and very finely punctured; its sides rounded, and its base bisinuate; disk punctured, with two well-marked transverse coppery keels. Elytra golden bronzy, depressed, and transversely rugose; sides subparallel, apices rounded. Beneath bronzy, punctured. Antennæ with their basal two joints large and swollen; apical six flat and dilated.

Length  $2\frac{1}{2}$  lines. Breadth  $\frac{3}{4}$  line.

*Hab.* Nagasaki.

*APHANISTICUS ANTENNATUS*. *Æneo-niger*. Capite minuto, inter oculos excavato. Antennis clavatis. Thorace valde punctato, subquadrato, disco tumido; lateribus, præsertim ad angulos posticos, late depressis. Elytris valde et rugose punctato-striatis, apicibus rotundatis denticulatis. Subtus punctatus.

Bronzy, black. Head very largely punctured on the vertex, narrowly, but deeply, grooved between the eyes; the edges of the groove carinated. Antennæ with the second joint very large and round; the terminal four joints forming a decided club. Thorax very largely, but not deeply, punctured, somewhat quadrate; sides rounded, chiefly in front; disk very convex; sides widely, especially at the hind angles, and base narrowly, depressed. Elytra deeply and rugosely punctate-striate, deeply sinuate below the shoulders, then suddenly swelling out to just below the middle, whence they become narrower to the apex, which is rounded and finely denticulate; sides narrowly depressed. Beneath and legs punctured.

Length  $1\frac{1}{2}$  line. Breadth  $\frac{3}{5}$  line.

*Hab.* Japan.

*APHANISTICUS CONGENER*, *E. S.* Ater, capite minuto. Thorace punctato, postice valde latiore, marginibus, præsertim prope angulos posticos, depressis. Elytris transverse rugosis, et punctato-striatis, apice rotundato. Subtus pedibusque punctatus.

Black. Head very small, channelled between the eyes. Thorax largely and irregularly punctured; front margin scarcely more than half the length of the base; sides rounded, chiefly posteriorly, and depressed,

especially near the hind angles; the margin itself is slightly elevated; base straight. Elytra transversely rugose and largely punctate-striate sides sinuated above the middle; apex rounded. Beneath and legs punctured. Antennæ somewhat as in the last species.

Length  $1\frac{1}{4}$  line. Breadth  $\frac{1}{2}$  line.

Resembles the preceding, but smaller, and may be at once separated from it by the shape of the thorax, which in this species is contracted in front.

CYLINDROMORPHUS JAPANENSIS, E. S. Elongatus, cylindricus. Capite æneo, magno, tumido, punctato. Thorace æneo, rugose punctato, lateribus valde carinatis, disco transversaliter elevato, basi valde depressa. Elytris rugosis, nigro-æneis, apicibus rotundatis. Subtus nigro-æneus, punctatus.

Elongate, cylindrical. Head and thorax bronzy, the former very large and swollen, channelled in front and deeply punctured. Thorax widest in front; anterior margin produced; sides almost straight; surface punctured in a variolose manner; disk with a smooth raised transverse line, between which and the base is a large depression bordered by the lateral carinæ, which are very strongly marked and nearly straight. Elytra bronzy black, transversely rugose, and punctured; apices rounded. Beneath and legs bronzy.

Length 2 lines. Breadth  $\frac{1}{2}$  line.

Hab. Japan.

#### TRACHYS.

*Species depressed. Thorax flattened at the sides. Elytra with a lateral carina above the margin.*

TRACHYS LEWISII, E. S. Thorax aureo-æneus. Elytra cyanea, sutura antice fasciisque duabus aureis albo-pubescentibus. Subtus ænea.

Head and thorax golden bronzy, covered with golden hairs; sides of the latter much depressed and flattened; anterior margin very much excavated, so as to receive the head, which is excavated between the eyes; sides rounded; base trisinate, middle lobe the largest; disk somewhat irregularly raised. Elytra cyaneous, with the apex, suture, and two transverse bands springing from it above the apex golden and covered with grey and golden pubescence, the golden pubescence predominating, especially on the suture and apex; surface irregularly punctured; sides gradually converging to the apex, which is widely rounded. Beneath dull bronzy black.

Length  $1\frac{1}{3}$  line. Breadth  $\frac{5}{8}$  line.

Hab. Japan.

TRACHYS GRISEO-NIGRA, *E. S.* Nigra. Capite thoraceque griseo-pubescentibus. Elytris griseis, macula oblonga utrinque ante medium, ad suturam conjunctis, alteraque rotundata prope apicem nigris. Subtus nigra.

Grey-pubescent. Elytra with an elongate spot on each, starting from the base and uniting at the suture about the middle, and a small round one between each and the apex, black. Beneath black.

Head deeply and semicircularly excavated between the eyes. Thorax with the anterior margin deeply and roundly emarginate, its angles enclosing the head, up to the backs of the eyes; sides rounded, depressed; base trisinate. Elytra with its sides straight, and gradually converging to the apex, which is very widely rounded; surface punctured. Beneath punctured.

Length  $1\frac{1}{3}$  line. Breadth  $\frac{5}{8}$  line.

*Hab.* Nagasaki.

TRACHYS ELEGANTULA, *E. S.* Aenea. Capite valde excavato, aureo-piloso. Thorace lateribus rotundatis, depressis, postice trisinuato, capillis aureis obsito. Elytris punctatis, capillis aureis variegatis. Subtus punctata.

Bronzy. Head golden-pubescent, deeply excavated between the eyes. Thorax with the anterior margin largely emarginate, its angles produced to the back of the eyes. Sides rounded, depressed; base trisinate; surface covered with greyish and golden hairs, with a deep fovea near each anterior angle. Elytra, sides converging in nearly straight lines two thirds of their length, then rounded to the apex; shoulders raised, lateral carina extending almost to the apex; surface punctured, with four irregular greyish pubescent bands, the two upper ones sinuate at the suture, the apical one nearly straight; there is also a very narrow basal band. In rubbed specimens the centres of the two middle bands are generally marked strongest. Beneath punctured.

Length  $1\frac{1}{4}$  line. Breadth  $\frac{3}{4}$  line.

*Hab.* Japan.

*Species without flattened sides to the thorax, and without lateral carinae to the elytra.*

TRACHYS AURICOLLIS, *E. S.* Capite thoraceque aureo-pilosis. Elytris nigris, antice griseo-variegatis, postice fasciis duabus valde sinuatis griseis ornatis, humeris prominentibus. Subtus nigra.

Head deeply excavated between the eyes, covered with long sericeous golden pubescence. Thorax with the base bisinuate; surface punctured in a scale-like manner, covered with golden pubescence with the exception of the base. Elytra rugosely punctured. Shoulders very prominent; sides slightly sinuate below them, rounded about the middle, and then somewhat straight to the apex, which is widely rounded. Above the middle of the elytra are several irregular grey

lines, and above the apex two well-marked grey zigzag bands.  
Beneath black, punctured.

Length 2 lines. Breadth  $1\frac{1}{8}$  line.

*Hab.* Japan.

*TRACHYS GRISEOFASCIATA*, *E. S.* Suboblonga, ænea, micans, fusco pubescens. Elytris antice irregulariter griseo-maculatis, postice fasciis duabus griseo-pilosis ornatis.

Elongate, golden. Head bronzy, shining, deeply excavated between the eyes, and covered with golden-brown hairs. Thorax bronzy; sides slightly rounded; base with a deep median lobe; surface covered with brown hairs. Elytra covered with chocolate-brown hairs; the shoulders rather prominent; sides rounded; posterior margin denticulate; apex rounded. Above the middle of the elytra are several irregular grey-pubescent lines; below the middle two well-marked wavy bands of the same colour. Beneath dull bronzy, slightly pubescent.

Length  $1\frac{3}{4}$  line. Breadth 1 line.

*Hab.* Japan.

*TRACHYS ROBUSTA*, *E. S.* Brevis, capite thoraceque fusco-pubescentibus. Elytris fusco-pilosis fasciis rufo-fuscis et griseis ornatis.

Very like the preceding, but shorter and wider, and altogether a stouter insect. The bands are arranged much in the same manner; but the chocolate-brown pubescence, instead of being evenly distributed all over the elytra, seems to be collected round the edge of the grey bands, the remaining surface being more sparsely covered.

Length 2 lines. Breadth  $1\frac{1}{8}$  line.

*Hab.* Japan.

*Obs.*—In one specimen the brown pubescence almost covers the grey, but its uneven disposition is still characteristic.

*TRACHYS CUPRICOLOR*, *E. S.* Capite thoraceque cupreis, nitentibus, aureo-pubescentibus. Elytris cupreo-fuscis, rugosis, fasciis irregularibus griseo-sericeis ornatis, apice cuprea. Subtus cupreo-fusca.

Head and thorax coppery golden, covered with golden hairs; the former excavated between the eyes, the upper margin of the excavation devoid of hairs. Thorax covered with golden hairs except just about the dorsal line, which is shining; base with a deep median lobe; near and above each posterior angle is a slight transverse impression; surface punctured. Elytra dark coppery brown, finely rugose; their front half variegated with grey lines of pubescence, the posterior with two narrow grey wavy bands; apex coppery. Shoulders somewhat prominent. Beneath coppery brown.

Length 2 lines. Breadth  $1\frac{1}{8}$  line.

*TRACHYS VARIOLARIS*, *E. S.* Æneo-nigra. Capite thoraceque aureo-pilosis. Thorace ad basin crinibus fuscis ornato. Elytris antice, capillis

albis atque fuscis, postice fasciis duabus albo-griseis ornatis. Subtus ænea, punctata.

Bronzy black. Head and thorax covered with golden hairs, the latter with a small tuft of brown hairs near the base on each side of the dorsal line and another between it and the margin; anterior margin emarginate; base with a depression above each of its sinuations. Elytra ornamented with irregular flexuous bands of brown and white hairs on their upper half; below the middle are two greyish white transverse bands, the middle of each brown; these lower bands are very strongly marked, and give a remarkable character to the species: in some specimens the brown is greatly predominant. Shoulders, which are decidedly prominent, and a tubercle above the apex, smooth; apex very largely rounded. Beneath bronzy, punctured.

Length 2 lines. Breadth  $1\frac{1}{8}$  line.

*Hab.* Japan.

TRACHYS INEDITA, E. S. Capite thoraceque æneis, sparse pubescentibus. Elytris æneis, rugose punctatis, tribus fasciis griseis irregularibus aureo-marginatis et valde sinuatis ornatis. Subtus æneo-nigra.

Head golden-yellow, pubescent, depressed on the vertex between the eyes, foveolated above the mouth. Thorax, sides nearly straight, base with a deep median lobe, somewhat sparsely covered with dark golden-yellow hairs. Elytra with the shoulders rather prominent; sides sinuate below them, then rounded below the middle, and converging to the apex; surface sparsely covered with short golden hairs, as the thorax, with three irregular zigzag grey bands, the two nearer the apex well marked, the upper one rather obscure; the grey of the bands is margined on the lower side with golden pubescence. Beneath black-punctured.

Length  $1\frac{1}{2}$  line. Breadth 1 line.

*Hab.* Japan.

TRACHYS INCONSPICUA, E. S. Ænea, punctata, capillis griseis obsita. Thorace postice impresso. Elytris tribus fasciis griseis ornatis, quarum media valde sinuata.

Short, bronzy, shining, sparsely covered with short grey silvery hairs. Head foveolated between the eyes. Thorax with the base slightly depressed and deeply lobed in the centre. Elytra with the shoulders rather prominent, each with a depression at the base above the shoulder; surface finely punctured, and covered with fine short hairs arranged in lines; near the middle is an interrupted band of grey silvery hairs consisting generally merely of two spots; below this is a well-marked zigzag band; and between it and the apex, and quite close to the latter, another very narrow one; apex rounded.

Length  $1\frac{1}{4}$  line. Breadth  $\frac{4}{5}$  line.

*Hab.* Japan.



## PARATRACHYS, E. S.

A genere præcedente differt *forma ovali, humeris* haud elevatis, *thoracis basi recta, capite plano* haud excavato, *antennis brevioribus*, articulis sex apicalibus dentatis atque etiam forma positæ antennarum cavorum.

This little genus may be distinguished from *Trachys*, its ally, by the following characters:—Shoulders not raised and prominent. Thorax with its base straight. Antennæ short and hairy, with their apical six joints dentate instead of five. Head flat, not excavated. Antennary cavities placed lower down and small. Tarsi with rather longer lamellæ.

N.B. I know of another species of this genus from India.

PARATRACHYS HEDERÆ, E. S. *Æneo-nigra*. Capite thoraceque punctatis, griseo nigroque pilosis. Elytris punctatis, nigro-pilosis, fasciis duabus post medium griseis ornatis. Subtus ænea, griseo, pubescens.

Bronzy black. Head punctured, covered with greyish hairs. Thorax with the anterior margin slightly produced; sides rounded; base straight; surface coarsely punctured and covered with black hairs, and with a fringe of grey hairs at the base. Elytra punctured, covered with black hairs, and with three grey bands, the first along the base, the second placed near the middle, and zigzag in its form, the third nearly straight and situated midway between it and the apex; the two lower bands are connected in the middle of each elytron; apex widely rounded. Beneath bronzy, punctured, grey-pubescent.

Length  $1\frac{1}{2}$  line. Breadth 1 line.

*Hab.* On ivy stems.

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On the Skeleton of the Apteryx.

By THOMAS ALLIS, F.L.S.

[Read December 3, 1872.]

THERE were exhibited two photographs of the skeleton of an Apteryx, which he had prepared and mounted himself; and Mr. Allis pointed out that it differed from the one figured by Professor Owen (in the second volume of the 'Transactions of the Zoological Society') in the absence of a nail at the end of the wing, in the greater breadth of the ribs, in the absence of foramina in the sternum and scapulo-coracoid, and in the more complete ankylosis of the sacro-caudal vertebræ—differences most of which might be attributed to the more mature condition of the specimen.

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On some new Fishes of India. By Surgeon-Major FRANCIS DAY,  
F.L.S., F.Z.S., Inspector-General of the Fisheries of India.

[Read April 3, 1873.]

WHILST inquiring into the fisheries at Madras and along the western coast of India or the contiguous Coimbatore district, the following new species of fish have (amongst others) been personally collected. A few remarks are likewise added on some of the specimens in the Madras Government Museum, which I took a hasty survey of whilst in that town.

Going over the identical ground I had previously collected in, as Vithry in the Wynaad and the Bowany river at the base of the Neilgherries, I found that fresh species rewarded a renewed research; whilst some which had been common at my former investigations were not then to be obtained.

*SERRANUS OCEANUS*, Lacép.

A specimen 9 inches long was captured at Madras last hot season, and is in the Museum. The whole of the dorsal fin has a blackish margin.

*GENYOROGA MELANURA*, Rüpp.

This fish, hitherto recorded as from the Red Sea, breeds at the Andaman Islands, where J. Wood Mason, Esq., captured several of the young in 1872.

*MESOPRION JOHNII*, Bloch.

I obtained a quantity of the small fry of this species from the Madras markets in December 1872; all had a spinous prolongation at the angle of their preopercles, which becomes lost as they grow larger. This, however, is evidently not the case with all the fish of this genus, as such is not seen in *M. Russellii*.

*SCATOPHAGUS ARGUS*, Linn.

In the very young a bony ridge, terminating in a strong spine, passes from the upper margin of the orbit to above the opercle, ending on the shoulder.

*OTOLITHUS BRUNNEUS*, sp. nov.

D. 9 |  $\frac{1}{28}$ , A.  $\frac{2}{7}$ , L. r. 102, L. tr.  $\frac{21}{34}$ .

Length of head  $\frac{2}{3}$ , of caudal  $\frac{2}{11}$ , height of body  $\frac{2}{11}$  of the total length.

Eyes: diameter  $\frac{1}{4}$  of length of head,  $1\frac{1}{2}$  diameter from end of snout.

Lower jaw slightly the longer, the posterior extremity of the maxilla reaches to beneath the hind edge of the orbit. Preopercle scarcely

denticulated, but most strongly so at its rounded angle. *Teeth* in the outer row enlarged; a pair of small canines. *Fins*: pectoral as long as the head without the snout; caudal pointed. *Colours*: brownish, becoming golden below; fins dark-coloured.

*Habitat*. Bombay, where it is not uncommon during the cold season. It attains at least 8 inches in length.

#### Fam. CARANGIDÆ.

There appear to be found in Madras a large number of Horse-Mackerels whose existence in the seas of the Indian Empire is still unrecorded. This fact did not escape the observation of the late Dr. Jerdon, who, in the 'Madras Journal of Literature and Science' (No. 39 of 1851), observed, after referring to ten distinct species, "besides all these, I have drawings of at least twelve more of this genus, most of which have distinct native names; but I have not the means of verifying them just now. They abound at Madras, but are comparatively rare on the Malabar coast." Amongst these twelve were probably the *Caranx mate*, Cuv. and Val., *C. Bidii*, Day, *C. melanostethos*, Day, and *C. nigrescens*, Day. Amongst the remainder would seem to be the following:—

##### CARANX GYMNOTETHOIDES, Bleeker.

A specimen about 18 inches in length is in the Madras Museum, which, however, has D.  $8 \frac{1}{30}$ , A.  $2 \frac{1}{27}$ , instead of D.  $8 \frac{1}{31}$ , A.  $2 \frac{1}{25}$ ; and two more, which I procured from the Bazaars, were identical with the Museum one. *Caranx macrurus*, Bleeker, *C. malam*, Bleeker, *C. ire*, Cuv. and Val., *C. sansun*, Rüpp., *C. chrysophryoides*, Bleeker, are all found in the sea at Madras.

##### HISTIOPHORUS BREVIROSTRIS, Playfair.

Two stuffed specimens, apparently identical with this species of Sword-fish, as described in the 'Fishes of Zanzibar,' exist in the Madras Museum. The longest is 4 feet 4 inches; they were obtained in Madras, where they are said to be not uncommon.

##### CYNOGLOSSUS MACROLEPIDOTUS, Bleeker.

This species of flatfish is common in Madras and on the Malabar coast.

##### CYNOGLOSSUS DUBIUS, sp. nov.

D. 110, V. 4, A. 88, C. 12, L. r. 104.

Length of head  $\frac{1}{4}$ , height of body  $\frac{2}{3}$  of the total length. *Eyes*, diameter  $\frac{1}{11}$  of length of head,  $1\frac{1}{2}$  diameter apart; the upper eye very slightly

in advance of the lower. The rostral hook does not extend backwards so far as to below the orbit. Lips not fringed. Angle of mouth in the middle of the length of the head. A patent nostril in the interorbital space, and a tubular one before the lower eye. *Teeth*, palate edentulous. *Fins*: pectorals absent; only left ventral present, and it is joined to the anal; vertical fins confluent. *Scales* cycloid on both sides of the body. *Lateral lines*, two on the left side separated by 21 rows of scales. *Colours*: left side brown, without marks.

*Habitat*. Gwadur. 20 inches in length.

This species, having *cycloid* scales, may almost be separated from the genus *Cynoglossus*, as, on the same grounds, *Æsopia* has been from *Plagusia*.

GLYPTOSTERNUM MADRASPATANUM, sp. nov.

D.  $\frac{1}{6}$  | 0, P.  $\frac{1}{11}$ , V. 6, A.  $\frac{2}{8}$ , C. 17.

Length of head nearly  $\frac{1}{5}$ , of caudal  $\frac{2}{3}$ , height of body  $\frac{2}{3}$  of the total length. *Eyes* small, in the commencement of the posterior half of the length of the head. Width of head equals its length posterior to the anterior nostrils. *Barbels*: the nasal extend two thirds of the distance to the orbit; the maxillary reach the base of the pectoral spine; the external mandibular to the gill-opening, whilst the internal pair are rather shorter. Occipital process very narrow, four times as wide as long. Lips not fringed. Adhesive apparatus well developed. *Fins*: dorsal spine strong, not enveloped in skin, and having a few serrations posteriorly; it is as long as the head from the angle of the mouth; base of adipose dorsal equals that of the rayed fin; the pectoral almost reaches the ventral, its spine being four fifths as long as the head; it is not plaited inferiorly; the outer ventral rays are not enlarged, neither are they plaited; lower caudal lobe somewhat the longer. *Caudal penduncle* twice as long as high. *Skin* smooth. *Colours* yellowish, with dark bands; fins also yellow banded with black.

*Habitat*. Bowany river, at the base of the Neilgherry hills. Out of five specimens, the longest was 5 inches in length.

It differs from *G. striatum* more especially in the character of its dorsal spine.

SAURUS INDICUS, sp. nov.

B. XV. D. 13/0, P. 13, V. 9, A. 9, C. 19, L. l. 55, L. tr.  $3\frac{1}{2}$  | 7.

Length of head  $\frac{3}{14}$ , of caudal  $\frac{2}{15}$ , height of body  $\frac{2}{15}$  of the total length. *Eyes*, diameter  $\frac{2}{3}$  of the length of the head, rather above 1 diameter from end of snout, and 1 diameter apart. Width of snout equals its length. Interorbital space somewhat concave. Internal half of frontal bone corrugated, as is also the occipital, with smooth interspaces between the striæ. Upper jaw slightly the longer. *Teeth*, a

single row on the palate. *Fins*: dorsal longer than high; pectoral extends to the tenth scale of the lateral line; caudal deeply forked. Body cylindrical, tapering before and behind. *Scales*: 17 rows between the occiput and the origin of the rayed dorsal fin; those on the side of the tail not keeled. *Colours*: brownish in the upper two thirds, dirty white beneath, numerous bluish irregular spots or blotches along the back and sides, in places almost forming horizontal bands; dorsal and caudal white, with greyish spots constituting irregular horizontal lines. *Habitat*. Madras, where I procured three specimens up to 7 inches in length.

It appears to be very similar to *S. atlanticus*, differing in the upper jaw being the longer, &c.

**OSTEOCHILUS MALABARICUS, sp. nov.**

B. III. D. 3/11, P. 19, V. 9, A. 3/5, C. 19, L. 1. 44, L. tr. 8/8.

Length of head from  $\frac{2}{11}$  to  $\frac{1}{8}$ , of caudal  $\frac{2}{9}$ , height of body  $\frac{1}{4}$  of the total length. *Eyes*, diameter  $\frac{2}{7}$  of length of head,  $1\frac{1}{4}$  diameter from end of snout, and also apart. Dorsal and abdominal profiles about equally convex. Interorbital space nearly flat. Upper jaw slightly the longer. Mouth compressed, narrow, somewhat horseshoe-shaped, as in some species of *Barbus*, and directed downwards. Lip on upper jaw moderately thick, and continuous with that on the mandible, which becomes thin in the mesial line and reflected from the lower jaw; no inner fold across the mandible, neither lip fringed; no horny substance over lips or inside the lower jaw. *Barbels* absent. *Fins*: dorsal without any osseous ray, commencing rather nearer the snout than the root of the caudal, and arising somewhat in advance of the ventrals, whilst it does not extend to above the anal; its upper edge is slightly concave, and the fin three fourths as high as the body below it; pectoral hardly so long as the head, and not reaching the ventrals, which last extend to over the commencement of the anal; caudal very deeply forked. *Scales*, none along the bases of the vertical fins. *Lateral line*, five rows of scales between it and the base of the ventral. *Colours*: silvery grey above, becoming lighter beneath; a dark band along the middle of the body, ending in a diffused black spot at the base of the caudal fin; fins orange, except the dorsal, which has a black band, commencing in the middle third of the fin, and becoming narrower to its posterior end; summit of anterior portion reddish, tipped with white.

*Habitat*. Vithry, in the Wynaad, where three specimens up to 6 inches in length were taken.

In none were the tubercles on the snout.



**BARBUS (BARBODES) WYNAADENSIS, sp. nov.**

B. III. D. 4/9, P. 17, V. 9, A. 3/5, C. 19, L. 1. 26-26, L. tr. 4 |  $\frac{4}{2}$ .

Length of head, caudal, and height of body each  $\frac{1}{3}$  of the total length.

*Eyes* small,  $\frac{1}{5}$  of length,  $1\frac{3}{4}$  diameter apart, and 2 from end of snout.

Dorsal and abdominal profiles about equally convex; body not elevated. Snout a little swollen, and lower jaw somewhat the shorter.

Lips moderately thick, not lobed. The posterior extremity of the maxilla extends to nearly beneath the anterior edge of the orbit. Interorbital space almost flat.

*Barbels* of moderate thickness; the maxillary pair as long, or longer than, the orbit, the rostral  $\frac{1}{4}$  shorter.

*Fins*: dorsal commences midway between the end of snout and the base of the caudal; its last undivided ray osseous, weak, but quite or nearly as long as the postorbital portion of the head, and having a soft termination; ventrals arise under the middle of the dorsal; the pectoral reaches to above the commencement of the ventral, which last does not reach the anal; caudal deeply forked.

*Lateral line* complete,  $2\frac{1}{2}$  to 3 rows between it and the base of the ventral fin. *Colours* very similar to those of *Barbus Denisonii*, except that it is orange below the black lateral band, which terminates in a black blotch at the base of the caudal.

*Habitat*. Vithry, where it is very common in the larger streams. Out of upwards of forty specimens, the largest was 8 inches in length.

**NEMACHEILUS PULCHELLUS, sp. nov.**

B. III. D. 2/10, P. 15, V. 9, A. 2/5, C. 21.

Length of head  $\frac{2}{11}$ , of caudal  $\frac{2}{9}$ , height of body  $\frac{1}{4}$  of the total length.

*Eyes* rather small, in the middle of the length of the head, about 2 diameters from end of snout, and rather above 1 apart. The width of the head opposite the opercles equals its length without the snout, which latter is somewhat pointed; the cleft of the mouth extends halfway to below the orbit.

*Barbels* six; the rostral thicker than the maxillary pair; whilst none are more than 1 diameter of the orbit in length.

No enlarged prominence to preorbital. *Fins*: dorsal commences slightly nearer the snout than the base of the caudal, its upper edge is oblique, whilst the height of the fin equals that of the body below it; pectoral as long as the head, its central rays prolonged; it extends two thirds of the distance to the ventral, which latter reaches nearly three fourths of the way to the anal, the last, when laid flat, extending to the base of the caudal, which has sharp lobes.

*Scales* very minute, but most apparent in the posterior portion of the body.

*Lateral line* moderately distinct. Free portion of the tail two thirds as high as long. *Colours*: this beautiful little Loach is greyish, becoming whitish below; there are two rows of large, vertical canary-coloured spots having deep-black margins along the side between the

head and the middle of the length of the body, posterior to which they become vertical bands, two thirds as wide as the ground-colour; each lobe of caudal with three or four oblique black bands, and a deep black spot at the centre of the base of the fin; dorsal yellow, with an orange spot at its anterior superior margin, and two wide black bands along it; anal with one black band.

*Habitat.* Bowany river. Twenty-one specimens up to  $2\frac{1}{2}$  inches collected.

*NEMACHEILUS CHRYSÆUS*, sp. nov.

B. III. D  $2\frac{8}{8}$ , P. 11, V. 9, A  $2\frac{5}{5}$ , C. 19.

Length of head nearly  $\frac{1}{5}$ , of caudal  $\frac{1}{5}$ , height of body  $\frac{1}{5}$  of the total length. *Eyes* in the commencement of the anterior half of the head, 1 diameter apart. The width of the head equals its length without the snout. Preorbital not enlarged. *Barbels* six, all short; the maxillary pair the longest, but not equalling 1 diameter of the orbit in length. *Fins*: the dorsal commences slightly nearer to the snout than to the base of the caudal, its upper edge straight, and its height equal to three fourths of that of the body below it; pectoral as long as the head, and extending two thirds of the distance to the base of the ventral, which latter reaches three fourths of the way to the anal; anal fin does not extend to the caudal if laid flat; the latter fin with pointed lobes in its last fourth. *Scales* small but distinct. *Lateral line* complete. *Free portion of tail* as high as long. *Colours*: golden; in the immature about ten greyish vertical bands, wider than the ground-colour, exist between the commencement of the dorsal fin and the tail; dorsal fin with three or four rows of fine spots; caudal with a black bar at its base, and eight or ten vertical sinuous rows of spots on its lobes; in the adult the body is very indistinctly banded, but its upper half has numerous black spots.

*Habitat.* Bowany river. Three specimens up to  $2\frac{2}{10}$  inches collected.

Amongst the sharks of Malabar, the *Carcharias melanopterus*, Quoy and Gaim., appears to be the most common of the larger sorts; whilst on the Madras coast it is comparatively rare. It attains many feet in length. Its liver is largely used in the preparation of fish-oil.

*CARCHARIAS MALABARICUS*, sp. nov.

Width of head equals its length from end of snout to angle of mouth.

Snout nearly as long as the mouth is wide. No labial fold except a groove at the angle of the mouth. *Teeth*: upper ones oblique, triangular, with rather enlarged bases, serrated in the whole extent of their cusps, twenty-eight; teeth in the lower jaw erect, slender, lanceolate, not serrated, and having broad bases. *Fins*: the posterior end of the base of the dorsal fin is the same distance from the ventral

as its anterior end is from the root of the pectoral; pectoral fin not so long as the head, one fourth longer than broad at its extremity, which is scarcely emarginate; its lower edge equals about half the length of its upper; base of second dorsal hardly above half the extent of that of the first dorsal, it is above the anal and about as large as it; upper edge of caudal straight; its length is slightly more than that of the interval between its origin and the base of the ventral. *Colours*: greyish above, white below; *the upper half of the anterior two thirds of the second dorsal is deep black.*

*Habitat.* One specimen, 15 inches in length, taken at Palliport, near Cochin, and two more, each 16 inches in length, at Calicut on the Malabar coast.

Calicut, January 21, 1873.

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### On some new Species of European Spiders.

By the Rev. O. P. CAMBRIDGE, M.A.

(PLATES XIV. & XV.)

[Read May 1, 1873.]

THE twelve spiders comprised in the following descriptions have been found almost at the extremities of Europe; two are from near Aberdeen, in Scotland, four from Corfu, two from the south of France, one from near Naples, one from Ischl, one from Bruck-am-Main, in Austria, and one from Switzerland. They belong to eleven genera, some of them widely distant from each other. Sketches are added, either of the whole or of portions of each species, from which it is hoped that the often minute, but generally satisfactory, distinctive characteristics of each species may be more easily perceived than from descriptions alone. The figures are not drawn to any particular scale; but a line is in each case added showing the natural length of the spider independently of its legs.

List of species, with references to page, Plate and figures.

- Ecobius ionicus*, ♂. Corfu. p. 531, Pl. XIV. fig. 1.
- Ariadne ionica*, ♂. Corfu. p. 532, Pl. XIV. fig. 2.
- Clubiona voluta*, ♀. Aberdeen. p. 533, Pl. XIV. fig. 3.
- Dictyna lugubris*, ♂, ♀. Corfu. p. 535, Pl. XIV. fig. 4.
- Oelotes Pickardi*, ♂. Switzerland. p. 537, Pl. XIV. fig. 5 a, d.
- Textrix Moggridgii*, ♀. Mentone. p. 537, Pl. XIV. fig. 6.
- Linyphia lepida*, ♀. Dunkeld. p. 539, Pl. XV. fig. 7.

*Xysticus Pavesii*, ♂. Naples. p. 540, Pl. XV. fig. 8.

— *defectus*, ♂. Bruck-am-Main. p. 541, Pl. XV. fig. 9.

*Monastes Staintoni*, ♀. Cannes. p. 542, Pl. XV. fig. 10.

*Thanatus mundus*, ♀. Mentone. p. 543, Pl. XV. fig. 11.

*Philodromus torquatus*, ♂. Corfu. p. 545, Pl. XV. fig. 12.

## Family ŒCOBIIDES.

### Genus ŒCOBIUS, Luc.

ŒCOBIUS IONICUS, sp. n. Pl. XIV. fig. 1.

Adult male, length slightly more than 1 line.

In general appearance, form, and structure this species is of the ordinary type, except that the caput is rather more roundly convex than usual. The *cephalothorax* (looked at from above) is circular, with a very straight prominent point at the middle of the fore margin; its colour is yellowish, margins black, and a longer black patch on each side of the prominent point mentioned above, with some other blackish markings on the clypeus, which projects forwards and in height equals half that of the facial space; the occiput has two blackish streaks, which converge to the thoracic junction in a blackish spot.

The *eyes* are eight in number, and form a nearly square figure, in two parallel curved rows, or four pairs, of which the respective eyes are contiguous to each other and placed obliquely; the inner eye of each of the two hinder pairs is, as usual in this genus, of an oblong form and flattened, looking like a mere shining surface, but is evidently an atrophied eye; the outer eye also of each of the two fore pairs is of an irregular form; the outer eye of each hinder pair appeared to be the largest of the eight and darkest-coloured, and strongly margined with black on its inner side; the inner eyes of the fore pairs are also dark, and placed on a strong black patch; the rest are pearly white.

The *legs* are rather long, tolerably strong, their length not very different; relatively it appeared to be (though this could not be ascertained with certainty) 2, 1, 4, 3; they are of a rather paler yellow colour than the cephalothorax, sparsely and obscurely marked with brown blotches or broken bands, and furnished pretty thickly with hairs (coarse bristly ones and others) and a few spines. Each tarsus ends with a supernumerary or heel-joint bearing three claws.

The *palpi* are similar in colour to the legs, except the digital joints, which are yellowish brown; they are moderately long, strong, and thickly furnished with coarse hairs: the radial and cubital joints are short and about equal in length and strength; the former has no apophyses at its extremity; the digital joints are very large, oval, and almost equal in length the whole of the rest of the palpus, or

at least exceed that of the humeral joint. The palpal organs are well developed, prominent, but not very complex, with several prominent corneous processes; but these are of a less exaggerated nature than in *Æcobius domesticus* (Luc.).

The *falces* are small and weak, and, with the labium and sternum (which are all of normal form), are similar in colour to the legs.

The *abdomen* is oval and flattish above, but projects considerably over the base of the cephalothorax, where it is somewhat truncate when looked at from above and behind; it is of a yellowish colour, clothed with coarse hairs: on the fore half of the upperside is a dentated, longitudinal, central band, faintly defined by a dusky brown marginal line, with a few other obscure blackish markings on the side of the fore part and upperside of the hinder half; some few white cretaceous spots are also visible on the upper side; the underside is of a uniform pale-yellowish colour: the spinners of the superior pair are much longer than the rest and turn upwards; in front of the normal six there is a transverse supernumerary one, or united pair: the anus has the peculiar fringe of coarse hairs observed as yet only in this and the allied genus *Uroctea* (Duf.).

A single example of this species was found by myself on the walls of my bedroom at the Hotel d'Orient at Corfu in May 1861.

### Family DYSDERIDES.

#### Genus ARIADNE (Savigny).

ARIADNE IONICA, sp. n. Pl. XIV. fig. 2.

Adult male, length 3 lines.

The whole of the fore part of this spider (except the labium and sternum, which are strongly suffused with dark brown) is of a brownish-yellow colour, the abdomen being dull drab-yellow, strongly suffused above with a warm reddish brown, but without (at least in the example described) showing any pattern or design.

The *cephalothorax* is oval, truncate before, very slightly constricted laterally in front, and rather flattened above, the caput and thorax being of the same elevation; it is (if any thing) a little darker in colour than the legs, and is narrowly margined with dusky brown: the normal grooves and indentations are but slightly marked; the surface is glossy, but (apparently) marked thinly with small round punctures.

The *eyes* are six in number, placed in three pairs very near the fore margin of the caput; those of the central pair are contiguous to each other; and those of each lateral pair are also contiguous to each other, and placed obliquely on a tubercle, the two hind laterals being in a straight line with those of the central pair.



The *legs* are long and tolerably strong; the femora of the fourth pair being very much stronger than the rest: their relative length is 1, 2, 4, 3; and they are furnished with a few hairs, and more thickly with black spines; the greater part of these last are on the tibiae and metatarsi of the first and second pairs; the femora of these pairs have 6, 4 of them in a single series along the uppersides; the femora of the third pair have 4, 3 of them in a single series along the uppersides; and the femora of the fourth pair have a single row of 8-10 along the undersides: each tarsus terminates with three curved claws, the two superior ones being the strongest and pectinated.

The *palpi* are moderately long; the cubital joint is very short, roundish, or nodiform; the radial is comparatively long and strong, being tumid or gouty, chiefly so towards its hinder extremity; the digital joint is of a somewhat oblong oval form, scarcely half the length of the radial, and nothing like it in strength, its concavity being also very slight. The palpal organs are simple, consisting of a large, globular, corneous, roundish bulb, with its fore extremity produced into a long, curved beak, tapering gradually to a fine point, bearing great resemblance to the palpal organs of the *Theraphosides*, and also of its nearer allies the spiders of the genus *Segestria*.

The *falces* are moderately long, not very strong, straight, but projecting a little forwards.

The *maxillæ* are long and enlarged at their extremities, where they are obliquely curved on the outer sides.

The *labium* is also long and pointed at its apex, round the margins of which are some small black points or very short bristles.

The *sternum* is oval, the fore extremity being rather the narrowest.

The *abdomen* is oblong oval, of a somewhat cylindrical form, and entirely destitute of hairs; possibly these may have been rubbed off; the spinners are six, short, and situated at the lower extremity of the abdomen; those of the inferior pair are much the strongest and rather the longest.

A single adult male of this spider was found by myself under a stone near the One-Gun battery at Corfu in May 1864.

## Family DRASSIDÆ.

### Genus CLUBIONA (Latr.).

*CLUBIONA VOLUTA*, sp. n. Pl. XIV. fig. 3.

Adult female, length  $3\frac{1}{2}$  lines.

In form, colour, and markings this spider bears close resemblance to several other British species; the colour of the cephalothorax is yellow; and it is furnished with dusky hairs, among which are a few darker ones of a bristly nature.

The *legs* are pale whitish yellow, furnished with hairs and black spines, those on the two fore pairs of legs being the longest and strongest, sessile, and arranged in pairs beneath the tibiæ and metatarsi; besides these are several on the uppersides of the femora: each tarsus ends with two claws, beneath which is a small scopula.

The *falces* are strong, slightly projecting forwards, and a little prominent near their base in front; they are furnished with a few black bristly and other hairs, and (except a small oval yellowish patch near their inner extremities) are of a rich dark yellow-brown colour.

The *maxillæ* and *labium* (which are of normal structure) are also of a deep yellowish brown, tipped with pale yellowish.

The *eyes* are nearly of the same size and placed on slight tubercles, in the ordinary position; but there is scarcely any perceptible clypeus; the fore central eyes almost touching the fore margin of the caput; the foremost row is much the shortest, straight, and equally divided by the eyes of which it is composed; the interval between those of the hind central pair is rather greater than that between each of them and the hind lateral nearest to it; and the fore central eyes form a quadrangular figure whose fore side is the shortest; the interval between each two eyes of the foremost row is about equal to an eye's diameter.

The normal grooves and indentations on the cephalothorax are nearly obsolete; that indicating the junction of the cephalic and thoracic segments is marked by a short, deep, red-brown line.

The *sternum* is heart-shaped, yellow, and has some red-brown *maculæ* on the margin, opposite the insertion of the legs.

The *abdomen* is oval, of a dark, warm, purplish, red-brown colour, streaked and marked with the normal pattern of pale reddish yellow, and pretty thickly clothed with fine yellowish-grey hairs; the underside is of a more uniform purplish red-brown, with two parallel pale reddish-yellow lines along its centre; these lines do not reach the spinners.

The epigyne connected with the sexual aperture is of large size and very unusual and characteristic form; it is very strong and broad, directed backwards, and folded inwards at its extremity; the figure given (Pl. XIV. fig. 3) will give a better idea of this portion of structure, by which the species may be known at a glance from others closely allied in form, structure, and colour.

A single adult female was kindly forwarded to me in 1872 by Mr. J. W. Traill, of the University of Aberdeen.

## Family DICTYNIDES.

## Genus DICTYNA (Sund.).

DICTYNA LUGUBRIS, sp. n. Pl. XIV. fig. 4.

Adult male, length  $1\frac{1}{2}$  line.

This spider is nearly allied to *D. globiceps* (Simon), which, as well as *D. benigna* (Bl., &c.) and several others, it closely resembles in general form and structure. It is, however, rather a larger species; and the caput is proportionally rather larger and more convex at the sides and occiput. The clypeus is impressed immediately below the eyes; but its lower margin is prominent and somewhat upturned or, rather, underhollowed; its height exceeds that of half the facial space. The colour of the cephalothorax is red-brown; and its surface is clothed with numerous short, greyish-white, somewhat squamose, bristly hairs.

The *eyes* are in the ordinary position, in two curved rows; the hinder row is the longest and most curved; and the extremities of the two rows meet by the lateral eyes (on each side) being contiguous to each other and obliquely seated on a small tubercle; the eyes of the foremost row appear to be equally distant from each other; but the two centrals of the hinder row are rather further from each other than each is from the lateral of the same row on its side; the four central eyes form a quadrangular figure, whose transverse is longer than its longitudinal diameter, and its fore side, though rather longer than the sides, yet shorter than the posterior side.

The *legs* are slender, moderately long, and of a dull yellowish-brown colour; the femora are darker than the tibiae, the metatarsi and tarsi being pale dull yellow: their relative length appears to be 1, 2, 4, 3; and they are clothed with fine hairs.

The *palpi* are short, furnished with hairs, and of a dull brown colour; the radial is, if any thing, rather longer, but less strong than the cubital joint; it has no apophysis at its extremity; but on its outer sides, a little nearer to the posterior than to the anterior extremity, is a small, black, sharp-pointed, tooth-like spine or hook directed downwards; the digital joint is longer than the radial and cubital joints together, roundish oval at its base, but the anterior portion is rather drawn out. The palpal organs are not complex; they consist of a not very large, roundish, corneous lobe, from the base of which, rather on the outer side, a twisted or somewhat corkscrew-shaped corneous process extends backwards beneath the radial joint; and from the middle of the inner side a strong process curves round in a circular form in front of the principal lobe; and in close connexion with the superior margin of this process there appears to be a strongish black filiform spine.

The *falces* are very long, strong, and of peculiar form ; they are generally rather prominent at their base in front, and have also an angular prominence there on the outer sides ; looked at from the front, they are strongly curved from each other, being also much excavated on their inner sides ; their extremities are broad, obliquely truncate, and flattened at the inner corners ; they are also very prominent behind, towards the base, in the form of a strong, blunt-angular prominence ; they are similar in colour to the cephalothorax ; and the greater part of their surface in front and on the sides is furnished pretty thickly with small blackish tubercles, giving them a roughened granular appearance ; their extremities have some bristly hairs near the fangs, which latter are neither very long nor strong.

The *maxillæ* and *labium* are of normal form, rather darker in colour than the falces ; while the sternum is of a still richer hue, being of a dark coppery-brown colour ; these parts are furnished with strong hairs, some of those on the sternum being greyish white.

The *abdomen* is black, with four small red-brown impressed spots or punctures, forming a quadrangular figure near the middle of the upperside, the fore side of the quadrangle being shortest ; it is more or less thinly clothed with short greyish-white hairs : the spinners are brown, and in front of the inferior ones is the usual supernumerary mammillary organ, or united pair of spinners ; those of the superior pair are less strong than the inferior, but have a small second joint.

The *colours*, as well as other specific characters, will serve to distinguish this spider easily from *D. benigna* (Bl.), *D. uncinata* (Westr.), and *D. pusilla* (Id.) ; while the granular surface of the falces especially, and other characters as well, will make it easily to be distinguished from *D. globiceps* (Sim.).

The female resembles the male in colours ; but the caput is less massive, and the falces are of a more ordinary form, though the surface is (but not so strongly) granular : the metatarsi of the fourth pair of legs have each a strong calamistrum on their outer sides.

Several adult males and one female were found by myself on low herbage at Corfu in May 1864 ; and a single adult male was subsequently received from the late Mr. Richard Beck, by whom it was taken somewhere on the continent of Europe ; but the locality is uncertain. Two examples of the male had the abdomen of a deep reddish-brown hue ; and on one there was a faint appearance of darker markings ; but I believe the usual colour may be taken to be black, as above described.



## Family AGELENIDES.

## Genus CÆLOTES (Bl.).

CÆLOTES PICKARDI, sp. n. Pl. XIV. fig. 5 a, d.

Adult male, length 4 lines.

This very interesting spider is exceedingly closely allied to *C. saxatilis* (Bl.), which it nearly resembles in size, form, and colours; it is, however, rather smaller than the average of the many examples of *C. saxatilis* (♂) which have come under my notice; it is also a darker-coloured spider, the dark-brown markings on the upperside and sides of the abdomen being in the present species much blacker, and the underside, which in *C. saxatilis* is invariably of an almost immaculate light yellow-brown, is in *C. Pickardi* strongly marked and suffused with black; the sternum also is deep black-brown, while in the other species named it is reddish yellow-brown; the cephalothorax also is of a deeper hue. But perhaps the strongest specific distinction, and one easily seen, is furnished by the form of the cubital joint of the palpus; in *C. saxatilis* (Pl. XIV. fig. 5, b, c) there is a strong apophysis at the outer extremity; but (when looked at from the outer side, as well as in some other positions) this apophysis has two angular prominences on its upperside, the one towards its base being the strongest; in *C. Pickardi*, however, the corresponding apophysis is totally destitute of any angular prominence; it is also rather longer and stronger, and tapers gradually, terminating in an obtuse point; it has likewise a slightly upward direction, while that of *C. saxatilis* is, if any thing, directed rather downwards; the apophysis also at the outer extremity of the radial joint is larger in this than in the present species; and some small differences are observable in the structure of the palpal organs.

A single adult male was contained in a small collection of Arachnida, kindly made for me in 1867, during a tour in Switzerland, by my cousin, the Rev. H. Adair Pickard, M.A., with whose name I have now great pleasure in connecting it.

## Genus TEXTRIX (Sund.).

TEXTRIX MOGGRIDGII, sp. n. Pl. XIV. fig. 6.

Adult female, length  $3\frac{3}{4}$  lines.

In form, general structure, and size, this spider is very like *T. lycosina* (Sund.); but it may be distinguished at once by the absence of any annulation on the legs or pattern on the cephalothorax, as well as by its generally paler and plainer colouring and the different design on the abdomen.

The cephalothorax, legs, and sternum are of a dull yellowish colour; the



former is very strongly constricted laterally forwards, the caput being produced, and broader at the fore margin than at the point of constriction, and the thorax round (oval when looked at from above). There is a strong dip or indentation in the profile line at the junction of the caput and thorax; and the junction of the thoracic segments is marked by a deeply impressed red-brown line; the other normal indentations are of a dusky hue: the caput has some long black bristles on its fore part directed forwards; and the rest of the cephalothorax has a few short fine hairs upon it: the height of the clypeus is less than half of that of the facial space.

The *eyes* are in two nearly concentric curved rows well separated from each other, the curves directed forwards, the hinder row being considerably the longest: the two central eyes of the hinder row are the largest of the eight, and are further from each other than each is from the hind lateral on its side; and a similar separation is observable between the eyes of the front row.

The *legs* are moderately long and rather strong, but not greatly differing in length; their relative length is 4, 1, 3, 2; they are of a dull yellowish colour, tinged with brown, and without any annulations or darker markings; they are furnished with longish hairs, bristles, and fine spines; and each tarsus ends with three claws.

The *palpi* are similar in colour to the legs, and are pretty well furnished with hairs and long spine-like bristles.

The *falces* are long and strong, a little directed backwards, prominent at their base in front, and of a deep reddish-brown colour.

The *maxillæ* and *labium* are of normal form, of a yellowish-brown colour, pale whitish at the extremities.

The *abdomen* is hairy, of a dusky blackish colour above, striated with lines of a pale dull hue on the sides; and on the fore part of the upperside in the central line is an elongate oblong marking of a pale dull colour, having a roughly angular prominent point about the middle on either side, and its posterior extremity strongly forked, branching off into an oblique bar on each side; this is followed by 2-3 angular bars or chevrons united at their apices, and decreasing in size towards the spinners: on each side of the elongate marking are two other irregular pale patches in a longitudinal and parallel line: on the underside the abdomen is of a dull whitish hue; and the sexual aperture is of peculiar and characteristic form; the spinners of the superior pair are two-jointed, long, and upturned, and of a pale dull yellowish-white colour.

A single adult female of this spider (which in the abdominal pattern greatly resembles spiders of the genus *Tegenaria*) was received early in the present year from Mentone, where it was captured, and kindly sent to me by J. Traherne Moggridge, Esq. As

far as I can ascertain, it seems to be of an undescribed and very distinct species, upon which I have great pleasure in conferring the finder's name.

### Family THERIDIIDES.

#### Genus LINYPHIA (Latr.).

*LINYPHIA LEPIDA*, sp. n. Pl. XV. fig. 7.

Adult female, length  $1\frac{1}{2}$  line.

The *cephalothorax* of this pretty species is yellow, margined with dusky blackish, the normal indentations, as well as a large wedge-shaped marking behind the eyes being suffused with sooty brown; in form it is of the ordinary type, though rather less convex, perhaps, than usual; the clypeus is prominent at its lower margin; and its height is rather greater than half that of the facial space.

The *eyes* are not very unequal in size, and are seated on strong black spots in the ordinary position; those of the hinder row are equidistant from each other; and those of the fore central pair (which are contiguous to each other) are separated from those of the hind central pair by about the same interval as that which separates the latter from each other; those of each lateral pair are seated obliquely, and contiguously to each other, on a tubercle.

The *legs* are slender and moderate in length; they are similar in colour to the cephalothorax, marked, however, slightly with blackish on the joints, and are furnished with hairs and fine black spines.

The *falces* are yellow, of moderate length and strength, a little prominent at their base in front, slightly divergent, and armed with but two or three very small, sharp, red-brown teeth near their inner extremities.

The *maxillæ* are strong, of normal form, yellow in colour, and a little inclined to the *labium*, which last is very short, and of a nearly semicircular form.

The *sternum* is heart-shaped and yellow, suffused with dusky black.

The *abdomen* is large, oval, very, but not excessively, convex above, and projecting over the base of the cephalothorax; it is of a dull ground-colour, pretty thickly blotched above and on the sides with irregular cretaceous yellowish-white spots; in the central line of the fore half of the upperside is an elongate, tapering, angularly margined, black band or stripe, reaching rather more than one third of the way towards the spinners; immediately following this are three black spots in a transverse line, after which, to the spinners, is a series of 6-8 angular lines or chevrons; the angles of these are broken, so that they form a double series of opposed, black, and some of them slightly curved, short, but distinct dashes; one pair of these dashes

(on the hinder part of the abdomen) forms a continuous transverse curved line, ending with a blotch at each extremity; no doubt these transverse bars vary in length and strength in different examples: each side has a strong irregular black patch on the middle; and the underside is dark brown, margined with black: the genital aperture is, like all of this genus, of peculiar structure, and has a prominent epigyne, with several small corneous-looking processes connected with it.

A single example of this very distinct *Linyphia* was received from Mr. J. W. Traill, by whom it was found near Dunkeld in 1872.

### Family THOMISIDES.

#### Genus XYSTICUS (Koch).

XYSTICUS PAVESII, sp. n. Pl. XV. fig. 8.

Adult male, length rather more than  $1\frac{1}{2}$  line.

In form and structure this very distinct and pretty species is of the ordinary type.

The *cephalothorax* is almost round, a little produced and constricted laterally before, and tolerably convex above; the hinder slope being gradual; its colour is brownish yellow tinged with orange, with two slightly darker longitudinal bands, one on each side, bearing a broad central longitudinal band, with a pale patch near the middle of it.

The *eyes* are on pale yellow-grey tubercles, in the ordinary position, of two parallel curved rows, the curves directed forwards, and the foremost row the shortest; the eyes of each row are as nearly as possible equidistant from each other; the four central eyes form a square, whose foremost side is rather shorter than the rest: the height of the clypeus is half that of the facial space.

The *legs* are moderately strong; those of the first and second pairs are long, much stronger than those of the third and fourth pairs; their relative length is 2, 1, 4, 3; they are furnished with hairs and spines; the colour of the first two pairs is yellow (tinged with brown), and the fore extremities of the tibial joints are of rather a deeper hue; the colour of the third and fourth pairs is pale yellow.

The *palpi* are short and not very strong; the cubital and radial joints are about equal in length, the former perhaps a little the longest; the latter has its fore extremity on the outer side produced into a moderately long, not very strong, slightly tapering apophysis, adhering closely to the side of the digital joint, and bifid at its extremity; also beneath the fore extremity of the radial joint is another moderately long, slightly curved, and obtusely pointed prominent apophysis; the

digital joint is oval, rather exceeding in length that of the radial and cubital joints together: the palpal organs are simple, and consist of a flattish corneous lobe; from their fore extremity a black, filiform, tapering spine issues, and, going first in an outward direction, coils completely round their margins, its fine point overlapping its origin.

The *falces* are moderately long, rather exceeding in length the height of the facial space, but not very strong; their colour is similar to that of the cephalothorax.

The *maxillæ*, *labium*, and *sternum* are yellow; and their form is of the usual type.

The *abdomen* is of a broadish oval form, somewhat truncated before and roundish-pointed behind; its upper surface is flattish; and it projects well over the base of the cephalothorax; it is of a pale yellowish colour; the upperside is furnished with a few fine hairs, and is closely mottled with irregular, silvery-yellow metallic spots; and its fore half has the five usual small circular depressions or punctures, the sides being of a dark rusty red-brown marked with longitudinal, parallel, sinuous lines of minute yellow dots, the underside being whitish-yellow, and the square between the spiracular plates a bright but pale orange-yellow: the anal tubercle and superior spinners are of the same colour as the sides; the inferior spinners yellow.

A single example was received several years ago from the neighbourhood of Naples; and I feel much pleasure in naming it after Dr. Pietro Pavesi (of the University of Genoa), who has given a considerable amount of attention to the Araneidea of Italy.

*Xysticus defectus*, sp. n. Pl. XV. fig. 9.

Adult male, length rather more than 2 lines.

This spider, though so decidedly distinct from *Xysticus cristatus* (Bl. et al.), is yet so exceedingly similar in form, colours, and markings that the description of one would do fairly well for that of the other; it is, however, rather a larger spider; the colours of the cephalothorax are darker and richer; the dark, wedge-formed, longitudinal, central marking behind the eyes terminates *obtusely* behind, instead of in a point, which is invariably the case in *X. cristatus*; the femora and genua of the first two pairs of legs are of a rich black chestnut-brown, without spots or any pale lines, the remainder, together with the legs of the third and fourth pairs, being of a uniform dull yellow; the hairs also on the abdomen are shorter and rather stronger; and the dentated band along the centre of its upperside is darker-coloured and less distinctly defined, though of a very nearly similar form; and the abdomen itself is of a more regular oval shape, being rounder or less truncate before.

The *palpi*, however, give the most obviously distinctive character: the radial joint is short and equal to the cubital in length; it has two



strongish apophyses from its extremity, one on the outer side obtusely and roundly pointed at its termination, and shorter than the corresponding one in *X. cristatus*; the other, rather near it, but below, towards the underside of the joint, is the largest and a little the longest, slightly curved and squarely truncate at its extremity: the digital joint is rather smaller in proportion than in *X. cristatus*, and is prominent near the middle of its outer side, but wants the pale process there so strongly marked in that species; at least, this process in the present species is quite rudimentary: the palpal organs are well developed but simple, and entirely wanting the conspicuous, prominent, corneous, spiny processes so notable in *X. cristatus* (and other nearly allied species); they appear to consist merely of a large not very convex corneous lobe, with two or three inconspicuous, slightly curved, sharp-pointed spines near their fore extremity; the inner margin of the palpal organs is black, and either of a corneous fillet-like nature, or else this appearance arises from a closely fitting spine running round it; it was difficult to ascertain exactly which.

An adult female found at the same time and place so exactly resembles the normal *X. audax* and some varieties of *X. cristatus*, that possibly it may not be the female of the present species; no doubt, however, it will be very difficult to distinguish this sex from that of the two before-mentioned species.

The single male described was found by myself in June 1865 running actively on a bare spot on the mountain-side at Bruck am Main in Austria.

### Genus MONASTES (Luc.).

MONASTES STAINTONI, sp. n. Pl. XV. fig. 10.

Female (not quite adult), length  $3\frac{1}{2}$  lines (nearly).

The *cephalothorax*, when looked at from above, is nearly round, truncate, and a little produced in front; it is moderately convex above; and the clypeus, which equals half the facial space in height, is very broad and projects considerably forwards at its lower margin, where there is a single transverse row of prominent bristles; the normal grooves and indentations are well marked; and there are a few prominent black bristles on the upper part: the colour is a pale greyish yellow-brown mottled with white, and spotted with small black spots.

The *eyes* are on large roundish tubercles, in two transverse, nearly parallel, slightly curved rows, of which the hinder is much longer than the front row; the two central eyes of the hinder row are nearer together than each is to the lateral of the same row on its side; and the same may be said of the two fore central eyes; the two end eyes of the hinder row on each side, with the fore lateral nearest to them, form an equilateral triangle.



*Legs* rather long, moderately strong; their relative length is 1, 2, 4, 3; they are of a pale greyish-yellow colour, washed or roughly striped (longitudinally) with white, and spotted with black; they are furnished with hairs; and the femora of the first pair, as also the tibiæ and metatarsi of the third and fourth pairs, have some fine longish spines; each tarsus ends with two black curved claws.

The *falces* are greyish yellow, speckled with black, they project forwards, and are moderately long and strong, but apparently rather excavated where they meet the *maxillæ*; these are long, narrow, a little curved, and inclined to the labium, which is of an oblong-oval form, round-pointed at its apex.

The *sternum* is heart-shaped, flattened, of a yellowish colour, mottled with white, and closely spotted with blackish spots.

The *abdomen* is (looked at from above) broader behind than before, and of a somewhat pentagonal form; its fore part projects greatly over the base of the cephalothorax; and from its hinder part rises a large eminence directed backwards and just over the end of the abdomen, and furnished above with black spines; the sides are strongly and longitudinally rugulose; and the whole has a wrinkled shrunken appearance: the colour of the abdomen is a mixture of dark and grey, white, greenish yellow-brown, and reddish yellow; a faint indication of a broadish, longitudinal, central, dentated band of a paler hue may be traced on the upperside; and the underside is of a dull whitish hue, with a broad, black-brown, longitudinal, central band.

Two examples (scarcely adult) were most kindly given me by H. T. Stainton, Esq., by whom they were captured, with some other interesting species, at Cannes, in the early spring of 1867; and it is with great pleasure that I connect his name with this very distinct and, I believe, undescribed spider.

### Genus THANATUS (Koch).

THANATUS (PHILODROMUS, *Walck. ad partem*) MUNDUS, sp. n. Pl. XV. fig. 11.

Adult female, length  $2\frac{3}{4}$  lines.

In form, colours, and general appearance, this spider is very like *T. setigerus* (Cambr.) found in Palestine; it is, however, larger, and differs in the form of the characteristic central, longitudinal, lanceolate marking on the fore part of the upperside of the abdomen; in the present species this marking terminates posteriorly in a narrow acute point, and is considerably and obtusely enlarged on each side at about its middle part, while in *T. setigerus* it is cut off behind in a straight transverse line, and the sides are merely very slightly angular.

The *cephalothorax* is clothed with hairs; and, looked at from above, is nearly round, the caput being produced at its fore part below; so

that the clypeus is prominent, and about equals in height half of the facial space, having its lower margin fringed with a row of close-set pale squamose hairs; it is of a yellow-brown colour, two broad longitudinal bands (one on each side) being of a deeper hue; the space between these dark lateral bands has a long narrow wedge-shaped marking of the same colour, beginning behind the hind central eyes and terminating in a point at the hinder margin; on the fore part of this marking are three narrow, longitudinal, dark-brown stripes, the central one being the longest; the space on each side of the wedge-shaped marking is thickly clothed with whitish hairs, some of a similar nature being also on the marginal bands: the caput and clypeus have some long, strong, black, prominent, spine-like bristles; among these are several others less strong, and of a pale diaphanous appearance. The normal converging grooves are indicated by darker lines than the surrounding surface.

The *eyes* are small and in the ordinary position, forming two transverse, nearly parallel, curved rows, the curves directed forwards; the front row is greatly the shortest and most curved; the interval between the eyes of the hind central pair is smaller than that between each and the hind lateral nearest to it, that between the eyes of the fore central pair being a little greater than that between each and the fore lateral nearest to it; and the interval between the two fore lateral eyes is a little greater than that between each and the hind lateral nearest to it.

The *legs* are long and tolerably strong; their relative length appeared to be 2, 4, 1, 3; they are of a brownish-yellow colour, furnished with hairs, black bristles, and spines, the finer hairs having a whitish hue; each tarsus terminates with two black curved claws and a claw-tuft beneath them.

The *palpi* are moderately long and similar in colour and armature to the legs.

The *falces* are moderate in length and strength, of a pale yellow-brown colour, and furnished on their uppersides with a few longish, prominent black bristles.

The *maxillæ*, *labium*, and *sternum* are normal in form; they are of a yellow colour tinged with brown, and furnished with black bristles.

The *abdomen* is oval, moderately convex above, of a greyish yellow-brown colour, dotted with hairs and spiny bristles; of the former there are many of a pale colour and squamose nature, mostly disposed rather in tufts or groups on the hinder part and sides; the spiny bristles are prominent, strong, and obtuse at their extremities; most of those on the middle and towards the fore part of the upperside are black; those on the sides and hinder portion are for the most part whitish and diaphanous: on the fore part of the upperside, in the central longitudinal line, is a strong and conspicuous, nearly black, velvety-looking

marking, narrowly margined with whitish, obtusely enlarged on either side a little past its middle point; and its hinder extremity draws in suddenly, and then terminates narrowly, tapering to a sharp point; from either corner, where it draws in, there is an oblique, short, dark dash, forming the anterior boundary of a broad tapering band, which reaches to the spinners, and is of a dark yellow-brown colour, having several deeper angular lines along its middle; the sides and underside are brownish yellow, the former rather the darkest. The genital aperture is of a somewhat oblong form, wider behind than in front, with dark, shining, reddish-brown, lateral margins.

The armature of the abdomen will distinguish this spider at once from *Philodromus* (*Araneus*) *formicinus* (Clk.), as also will the form of the large marking on the fore part of the upperside as well as the character of the other markings; it has no lateral black or dark patch, as in *P. setigerus*, from which also other peculiarities (as above noticed) separate it.

A single example of this very interesting spider was kindly brought to me from Mentone in March 1867 by H. T. Stainton, Esq.

### Genus *PHILODROMUS* (Walck.).

*PHILODROMUS TORQUATUS*, sp. n. Pl. XV. fig. 12.

Adult male,  $1\frac{3}{4}$  line.

This species is allied to *P. aureolus* (Walck.), but its much smaller size, as well as its strikingly different colours and the structure of the palpi, will serve to make it easily distinguishable in the adult state.

The *cephalothorax* is of the ordinary form, the clypeus projecting and exceeding in height half that of the facial space: the sides and clypeus are of a deep, rich, black chestnut-brown, leaving a broad longitudinal space on the upperside; the hinder half of the space is of a brownish-yellow colour, slightly mottled with a darker line; on the fore half there is a large crescent-formed, collar-like, pale cream-coloured marking; its convexity is directed backwards; and it has two dark blotches, one near each horn of the crescent, and two small dark spots in a short transverse line near its hinder extremity; between this and the eyes the colour is like that of the eye-area and clypeus, with a pale brownish-yellow band along the middle, having its posterior termination in the extreme concavity of the crescent above mentioned; this band has on it two parallel, longitudinal, dark-brown lines.

The *eyes* are small, very nearly of equal size, and in the ordinary position, but forming a rather narrower (and so longer) crescent-formed figure; six of them form a long transverse curved row; and between the two extreme eyes of this row, but within the straight line formed by them, are two more; these two are further from each other

than each is from the extreme eye (mentioned before) on its side; the two centrals of the front row are also nearer to each other than each is to the one next to it on its side.

The *legs* are long, rather slender, of a yellowish-brown colour, the femora being strongly marked longitudinally with a much darker colour than the rest, nearly as dark as the sides of the cephalothorax; they are furnished sparingly with hairs, and with spines of different lengths; their relative length appeared to be 2, 1, 4, 3.

The *palpi* are moderately long and similar in colour to the legs, the hinder part of the humeral joint being darker than the rest; the radial and cubital joints are short; the former is the shortest, and has a small, pointed, curved apophysis beneath its fore extremity, rather on the outer side; the digital joint is rather large, of an oval form, and longer than both the radial and cubital joints together: the palpal organs are very simple, and not prominent; they have a rather strong, curved, sharp-pointed, corneous process curving round their fore extremity, the sharp point being on the outside.

The *falces* are moderate in length and strength, of a subconical form, and (looked at in profile) directed backwards; they are, as also are the *maxillæ*, *labium*, and *sternum*, of the same colour as the cephalothorax.

The *abdomen* is oval, rather broader behind than in front, where it is truncated, and projects over the base of the cephalothorax; the colour is a dark purplish yellow-brown; and on the fore half of the upperside is a large oblong white patch, along the longitudinal centre of which is the ordinary characteristic marking, of a larger size than usual, its sides irregularly notched or dentate, and its colour as dark as that of the cephalothorax; towards the hinder part of the sides of the abdomen are a longitudinal series of three curved, narrow, white bars, each one decreasing in length and strength behind the other; between these, along the middle of the hinder part of the abdomen are three curved, pale greyish, obscure, angular bars or chevrons; immediately behind the oblong white patch on the fore part, and in a transverse line, are two largish circular depressions of a deeper hue than the rest of the surrounding surface; the underside is rather paler than the upperside, and has some obscure, pale, longitudinal, broken, parallel lines; the spiracular plates are cream-coloured.

Probably the females and immature, or lately matured, males will be found to approach very nearly in colour and markings to *P. aureolus* and *P. cespiticolis*.

Two adult males were found by myself on low plants at Corfu in May 1865.

## EXPLANATION OF PLATES XIV. &amp; XV.

Fig. 1. *Ecobius ionicus*, sp. n., ♂.

*a*, spider, in profile, without legs; *b*, ditto, from above; *c*, eyes, from behind and above; *d*, left palpus, from the outer side, rather in front; *e*, natural length of spider.

Fig. 2. *Ariadne ionica*, sp. n., ♂.

*a*, spider, in profile; *b*, caput, showing eyes; *c*, maxillæ and labium; *d*, left palpus, from outer side; *e*, natural length of spider.

Fig. 3. *Clubiona voluta*, sp. n., ♀.

*a*, spider (without legs), from above; *b*, ditto, in profile; *c*, *d*, epigyne, from above and in profile; *e*, natural length of spider.

Fig. 4. *Dictyna lugubris*, sp. n., ♂.

*a*, spider, in profile; *b*, caput and falces, from the front; *c*, left palpus, from the front; *d*, natural length of spider.

Fig. 5. *Celotes Pickardi*, ♂.

*a*, left palpus, from outer side; *d*, natural length of spider; *b*, left palpus, from outer side, of a closely allied species (*Celotes saxatilis* (Bl.)); *c*, natural length of spider.

Fig. 6. *Textrix Moggridgii*, sp. n., ♀.

*a*, spider, from above; *b*, ditto, in profile, with legs truncated; *c*, genital aperture; *d*, natural length of spider.

Fig. 7. *Linyphia lepida*, sp. n., ♀.

*a*, spider in profile; *b*, ditto, upperside; *c*, *d*, genital aperture and epigyne, from above and in profile; *e*, natural length of spider.

Fig. 8. *Xysticus Pavesii*, sp. n., ♂.

*a*, spider, from above; *b*, left palpus, from underneath; *c*, right palpus, from above and behind; *d*, dimensions, showing natural length and extent of legs.

Fig. 9. *Xysticus defectus*, sp. n., ♂.

*a*, spider, upperside; *b*, left palpus, from above; *c*, natural length of spider.

Fig. 10. *Monastes Staintoni*, sp. n., ♀.

*a*, spider, from above; *b*, ditto, in profile, with legs truncated; *c*, fore part of caput and eyes, from above and behind; *d*, natural length of spider.

Fig. 11. *Thanatus mundus*, sp. n., ♀.

*a*, spider, from above, legs truncated; *d*, ditto, in profile; *c*, genital aperture; *d*, natural length of spider.

Fig. 12. *Philodromus torquatus*, sp. n., ♂.

*a*, spider, from above, legs truncated; *b*, ditto, in profile; *c*, caput and falces, from the front, showing the eyes; *d*, natural length of spider.





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